Part C T837 Paging Exciter

This part of the manual is divided into six sections, as listed below. There is a detailed table of contents at the start of each section.

Section	Title
1	General Information
2	Circuit Operation
3	Initial Tuning & Adjustment
4	Functional Testing
5	Fault Finding
6	PCB Information

1 T837 General Information

This section provides a brief description of the T837 paging exciter, along with detailed specifications and a list of types available.

The following topics are covered in this section.

replace A4 pages C1.3/C1.4 with A3 pages C1.3/C1.4

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1.1 Introduction

The T837 is a synthesised, microprocessor controlled, DFSK low speed paging exciter designed for single or multichannel[1] operation in the 148 to 174MHz frequency range[2]. With a standard power output of only 800mW, the exciter is designed for use with the T839 100W power amplifier. The RF section of the exciter comprises a frequency synthesiser which provides 170mW of frequency modulated RF drive to a two stage, wide band output amplifier. The synthesiser frequency is programmed via the serial communications port.

The low speed paging modulator section provides DFSK modulation. It incorporates a TCXO frequency reference and uses two point modulation to achieve modulation of data rates from 2400bps down to DC.

All components except those of the VCO are mounted on a single PCB. This is secured to a die-cast chassis which is divided into compartments to individually shield each section of circuitry. Access to both sides of the main circuit board is obtained by removing each of the chassis lids. There is provision within the chassis to mount small option PCBs.

The front panel has two indicator LEDs to show when the transmit carrier is on (red) and when the DC supply is connected (green). The T837 is 60mm wide and occupies a single space in a Tait rack frame, which has the ability to accommodate up to seven standard modules.

1. Although you can program the microcontroller with up to 128 channels, you must carry out the modulation adjustment procedure if you change frequency (see Section 3.5).
2. Although capable of operating over the 148-174MHz frequency range, the T837 has an 8MHz VCO switching range (see Section 1.2.3 and Section 3.1).

1.2 Specifications

1.2.1 Introduction

The performance figures given are minimum figures, unless otherwise indicated, for equipment tuned with the maximum switching range and operating at standard room temperature (+22°C to +28°C) and standard test voltage (13.8V DC).

Where applicable, the test methods used to obtain the following performance figures are those described in the EIA and ETS specifications. However, there are several parameters for which performance according to the Chinese specification GB/T 15938 is given. Refer to Section 1.2.6 for details of test standards.

Details of test methods and the conditions which apply for Type Approval testing in all countries can be obtained from Tait Electronics Ltd.

1.2.2 General

Number Of Channels		.. 128 (standard)[1]
Supply Voltage:		
Operating Voltage		.. 10.8 to 16V DC
Standard Test Voltage		.. 13.8V DC
Polarity		.. negative earth only
Polarity Protection		.. crowbar diode
Line Keying Supply (if required)		.. -50V DC
Supply Current:		
Transmit		.. <650mA
Standby	- T837-2X-1020	.. <150mA
	- T837-2X-1021	.. <200mA
Operating Temperature Range		.. -30°C to +60°C
Dimensions:		
Height		.. 183mm
Width		.. 60mm
Length		.. 320mm
Weight		.. 2.1kg
Time-Out Timer (optional)		.. 0 to 5 minutes[2] adjustable in 10 second steps

1. Additional channels may be factory programmed. Contact your nearest Tait Dealer or Customer Service Organisation.
2. Adjustable from 0 to 10 minutes in PGM800Win version 2.12 and later.

Tail Timer	..	0 to 5 seconds adjustable in 100ms[1] steps
Transmit Key Time:		
T837-20-102X	..	<100ms
T837-26-102X	..	<30ms
Transmit Lockout Timer	..	0 to 1 minute adjustable in 10 second steps

1.2.3 RF Section

Frequency Range	..	148-174MHz
Modulation Type	..	DFSK
Frequency Increment:		
T837-20-102X	..	5 or 6.25kHz
T837-26-102X	..	2.5 or 3.125kHz
VCO Switching Range	..	8MHz
Load Impedance	..	50 ohms
Frequency Stability:		
T837-2X-1020	..	±1.0ppm, -20°C to +70°C ±2.0ppm, -30°C to +70°C
T837-2X-1021	..	±1.5ppm, -30°C to +70°C
External Reference Frequency (T837-2X-1021)	..	100kHz to 25.6MHz in 100kHz steps
External Reference Amplitude	..	0 to +10dBm into 50Ω
Adjacent Channel Power (4.5kHz deviation)	..	-75dBc (ETS) -70dBc (GB/T 15938)
Transmitter Side Band Noise: (no modulation, 15kHz bandwidth)		
At ±25kHz	..	-95dBc
At ±1MHz	..	-105dBc
Radiated Spurious Emissions:		
Transmit	..	-36dBm to 1GHz -30dBm to 4GHz
Standby	..	-57dBm to 1GHz -47dBm to 4GHz

1. Adjustable in 20ms steps in PGM800Win version 2.12 and later.

Power Output	.. 800mW ±200mW
Transmit Keying Noise	.. -70dBc (GB/T 15938)

1.2.4 Low Speed Paging Modulator

Accepted Protocols/Speeds:

T837-20-102X	.. POCSAG 512/1200 and FLEX 1600
T837-26-102X	.. POCSAG 512/1200/2400 and FLEX 1600
Input Data Levels	.. TTL

Data Rise Time (10% - 90%):

T837-20-102X	.. <150µs (GB/T 15938)
T837-26-102X	.. <115µs

1.2.5 Microcontroller

Auxiliary Ports:

Open Drain Type	.. capable of sinking 2.25mA via 2k2Ω
V_{ds} max.	.. 5V

1.2.6 Test Standards

Where applicable, this equipment is tested in accordance with the following standards.

1.2.6.1 European Telecommunication Standard

ETS 300 113 March 1996

Radio equipment and systems; land mobile service; technical characteristics and test conditions for radio equipment intended for the transmission of data (and speech) and having an antenna connector.

1.2.6.2 Telecommunications Industry Association

ANSI/TIA/EIA-603-1992

Land mobile FM or PM communications equipment measurement and performance standards.

1.2.6.3 Chinese Radio Regulatory Commission

GB/T 15938 - 1995

General specification for equipment of radio paging systems.

1.3 Product Codes

The three groups of digits in the T830 Series II product code provide information about the model, type and options fitted, according to the conventions described below.

The following explanation of T830 Series II product codes is not intended to suggest that any combination of features is necessarily available in any one product. Consult your nearest Tait Dealer or Customer Service Organisation for more information regarding the availability of specific models, types and options.

Model

The Model group indicates the basic function of the product, as follows:

T83X-XX-XXXX
T837 exciter
T838 50W power amplifier
T839 100W power amplifier

Type

The Type group uses two digits to indicate the basic RF configuration of the product.

The first digit in the Type group designates the frequency range:

T83X-**X**X-XXXX '2' for 148-174MHz

The second digit in the Type group indicates the channel spacing:

T83X-X**X**-XXXX
'0' for wide bandwidth (25kHz) - standard
'6' for wide bandwidth (25kHz) - USA

Options

T83X-XX-**XXXX** The Options group uses four digits and/or letters to indicate any options that may be fitted to the product. This includes standard options and special options for specific customers. '0000' indicates a standard Tait product with no options fitted. The large number of options precludes listing them here.

1.4 T837 Paging Product Range

The following table lists the range of T837 paging product types available at the time this manual was published. Consult your nearest Tait Dealer or Customer Service Organisation for more information.

Frequency Range (MHz)		148-174			
Deviation (kHz)		5			
Baud Rate (bps)		1200	1200	2400	2400
Frequency Increments (kHz)		5/6.25	5/6.25	2.5/3.125	2.5/3.125
TCXO	±1.0ppm -20°C to +70°C ±2.0ppm -30°C to +70°C	•		•	
	±1.5ppm -20°C to +70°C		•		•
Exciter Type: T837-		20-1020	20-1021	26-1020	26-1021

You can identify the exciter type by checking the product code printed on a label on the rear of the chassis (Figure 1.1 in Part A shows typical labels). You can further verify the exciter type by checking the placement of an SMD resistor in the table that is screen printed onto the PCB (refer to Section 6.1 for more details).

2 T837 Circuit Operation

This section provides a basic description of the circuit operation of the T837 paging exciter.

Note: Unless otherwise specified, the term "PGM800Win" used in this and following sections refers to version 2.00 and later of the software.

Refer to Section 6 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components and test points on the main PCB. The parts list and diagrams for the VCO PCB are in Part E.

The following topics are covered in this section.

2.1 Introduction

The individual circuit blocks which make up the T837 are:

- synthesiser
- VCO
- paging modulator
- drive amplifier
- voltage regulators.

Each of these circuit blocks is set in its own shielded compartment, formed as an integral part of the main chassis.

The configuration of the circuit blocks may be seen on a functional level in Figure 2.1. Refer to the circuit diagrams in Section 6.2 for more detail.

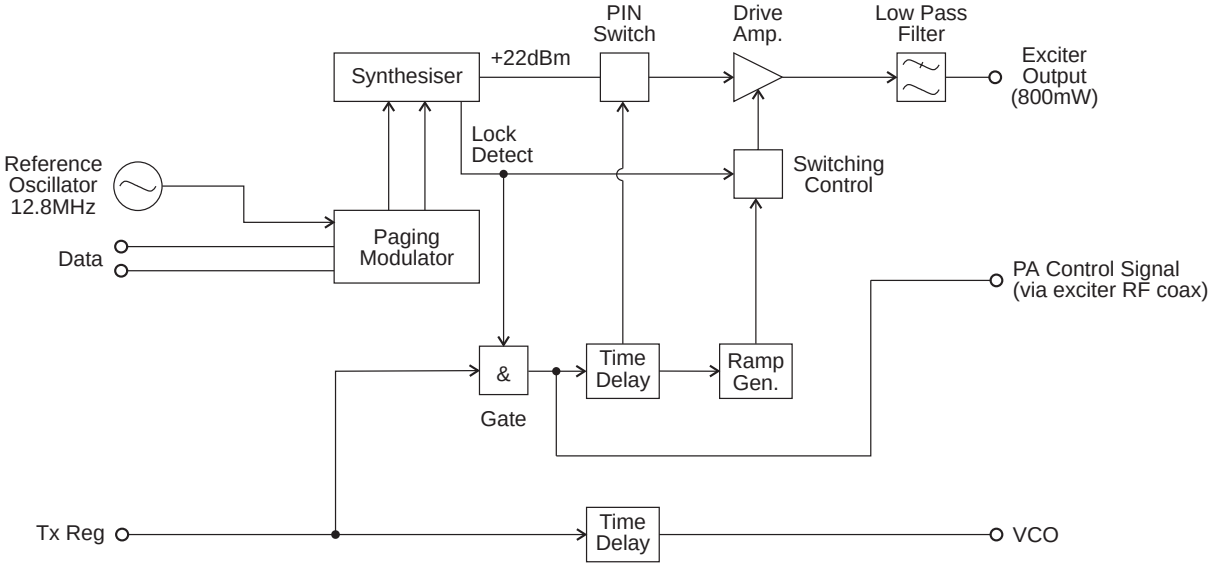


Figure 2.1 T837 High Level Block Diagram

2.2 Microcontroller

(Refer to the microcontroller circuit diagram (sheet 8) in Section 6.2.)

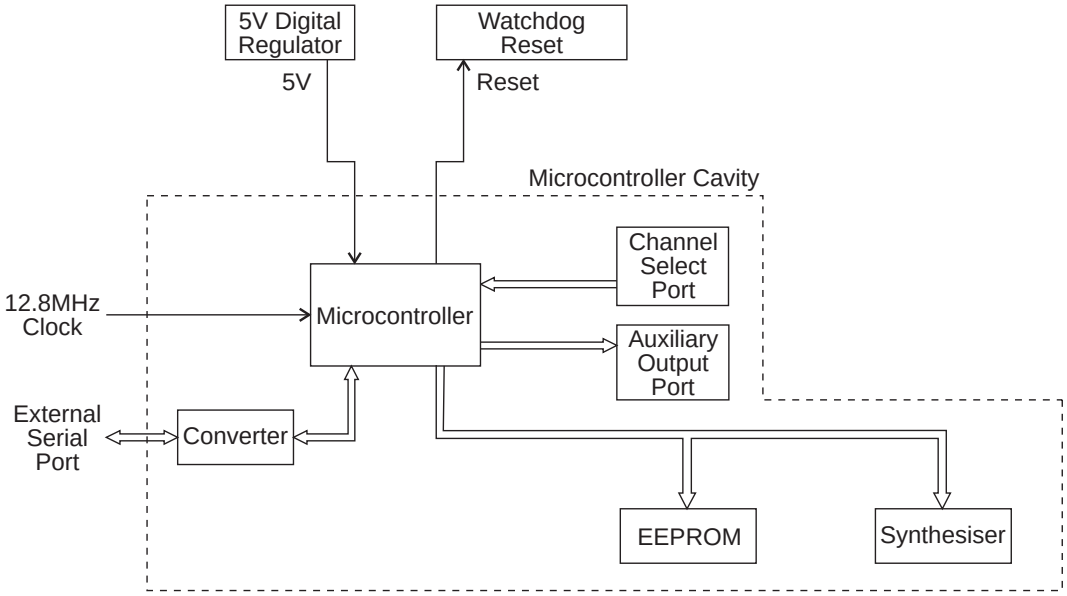


Figure 2.2 T837 Microcontroller Block Diagram

Overall system control of the T837 is accomplished by the use of a member of the 80C51 family of microcontrollers (IC810). It runs from internal ROM and RAM, thus leaving all four ports free for input/output functions.

Non-volatile data storage is achieved by serial communication with a 16kBit EEPROM (IC820). This serial bus is also used by the microcontroller to program the synthesiser (IC740).

The main tasks of the microcontroller are as follows:

- program the synthesiser;
- interface with the PGM800Win programming software at 9600 baud via the serial communication lines on D-range 1 (PL100);
- coordinate and implement timing control of the exciter;
- control the front panel "Supply" LED (refer to Section 5.3).

2.3 Synthesised Local Oscillator

(Refer to the synthesiser circuit diagram (sheet 7) in Section 6.2 and the VCO circuit diagram in Part E.)

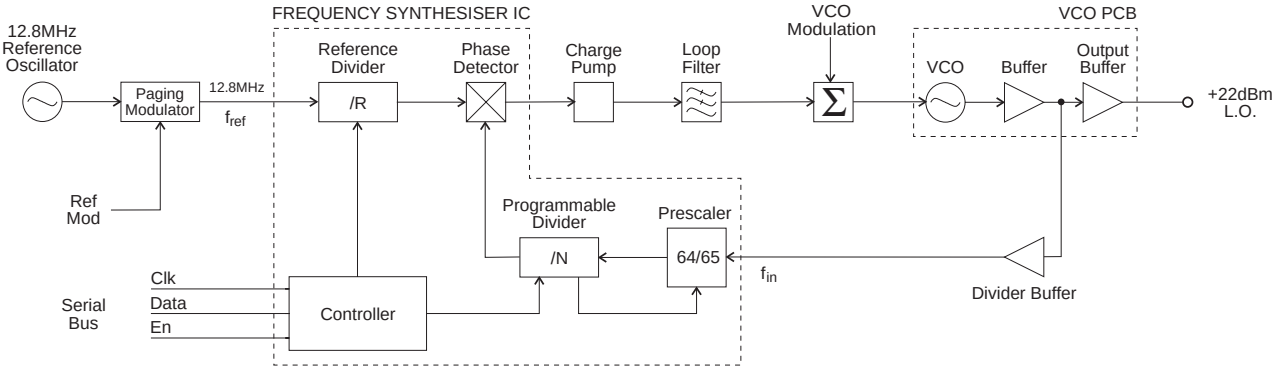


Figure 2.3 T837 Synthesiser Block Diagram

The synthesiser (IC740) employs a phase-locked loop (PLL) to lock a voltage controlled oscillator (VCO) to a given reference frequency. The synthesiser receives the divider information from the control microprocessor via a 3 wire serial bus (clock, data, enable). When the data has been latched in, the synthesiser processes the incoming signals from the VCO buffer (f_{in}) and the phase modulator (f_{ref}).

A 12.8MHz reference frequency is fed from the paging modulator section to the frequency synthesiser Ref_{in} (IC740 pin 20). This reference frequency is derived from the VCXO (X101), which is locked to the internal frequency standard provided by the TCXO (X100). The reference frequency has been modulated in the VCXO by the incoming data to allow the synthesiser loop to modulate down to DC. This 12.8MHz reference frequency is divided down to 6.25kHz or 5.0kHz in the synthesiser IC (IC740).

A buffered output of the VCO (Q795) is divided with a prescaler and programmable divider which is incorporated into the synthesiser chip (IC740). This signal is compared with the phase modulated reference signal at the phase detector (also part of the synthesiser chip). The phase detector outputs drive a balanced charge pump circuit (Q760, Q770, Q775, Q780, Q785) and active loop filter (IC750 pins 5, 6 & 7) which produces a DC voltage between 0V and 20V to tune the VCO. This VCO control line is further filtered to attenuate noise and other spurious signals. Note that the VCO frequency increases with increasing control voltage.

If the synthesiser loop loses lock, a pulsed signal appears at LD (pin 2) of IC740. This signal is filtered and buffered by IC750 pins 1, 2 & 3, producing the Lock-Detect signal used to shut off the power supply to the drive amplifier. IC750 pin 1 is at 20V when the synthesiser is out of lock.

2.3.1 Two Point Modulation

Frequency modulation occurs by modulating both the VCO input and the synthesiser reference input. This process is called two point modulation and ensures a flat modulation response from 0 to 2400bps.

The PLL has a fast response time, allowing a Tx key-up time of <30ms. Because of this fast response time the PLL sees lower modulation frequencies superimposed on the VCO as an error and corrects for it, resulting in no modulation on the carrier. At modulation frequencies greater than 300Hz the loop cannot correct fast enough and modulation is seen on the carrier.

To achieve low frequency modulation, the reference oscillator is also modulated so that the phase detector of IC740 detects no frequency error under modulation. Thus, the synthesiser loop will not attempt to correct for modulation and the data frequency response of the transmitter remains unaffected.

2.4 VCO

(Refer to the VCO circuit diagram in Part E.)

The VCO transistor (Q1) operates in a common source configuration, with an LC tank circuit coupled between its gate and drain to provide the feedback necessary for oscillation. The VCO control voltage from the loop filter (IC750 pin 7) is applied to the varicaps (D1-D4) to facilitate tuning within an 8MHz band of frequencies. A trimcap (CV1) is used for coarse tuning of the VCO. The output from the oscillator circuit drives a cascode amplifier stage (Q2, Q3) which supplies +10dBm (typically) to a further stage of amplification, Q5. This is the final amplifier on the VCO PCB, and delivers +22dBm (typically) to the exciter drive amplifier.

A low level "sniff" is taken from the output of Q3 and used to drive the divider buffer (Q795) for the synthesiser (IC740).

The VCO operates at the actual output frequency of the exciter, i.e. there are no multiplier stages. The VCO is modulated by superimposing the data signal onto the control voltage and by frequency modulating the reference signal.

2.4.1 VCO Supply

The VCO is supplied from two switched +9V supplies under the control of the Tx-Reg. supply.

The VCO (Q1) and buffer amplifier (Q2 & Q3) are supplied from one +9V switched supply by Q540 via the capacitor multiplier (Q550, C550).

The output amplifier is supplied from the other +9V supply by Q520, Q530, and Q510.

A delay circuit holds the VCO on for a short time after the Tx-Reg. supply has been switched off. This is to allow the RF power circuits (both exciter and PA) to ramp down in the correct manner before the VCO is switched off.

2.5 Low Speed Paging Modulator

(Refer to the low speed paging modulator circuit diagram (sheet 2) in Section 6.2.)

2.5.1 General

The T837-2X-102X is a dedicated paging exciter. The low speed paging modulator section of the exciter accepts TTL data at the D-range input and modulates the synthesiser using a two point modulation method that provides modulation of data input frequencies of 2400bps down to DC (all 1's or all 0's).

The paging modulator section incorporates a TCXO frequency reference and a modulatable VCXO which is locked to the reference frequency from the TCXO.

The paging modulator also has provision for fitting an optional FFSK modem PCB.

2.5.2 AFC/PLL Operation

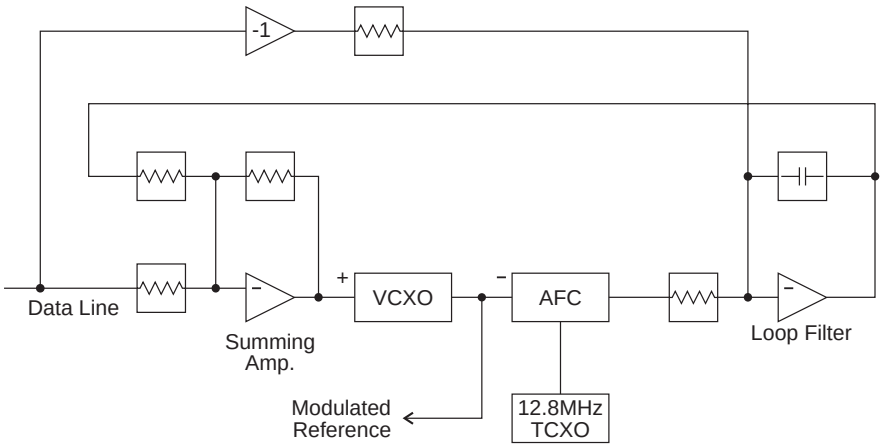


Figure 2.4 T837 AFC Block Diagram

The TCXO is the default frequency standard. In PLL mode, the slave 12.8MHz VCXO is phase locked to the TCXO. Both the TCXO and the VCXO outputs are clipped in IC100 and IC102 and then frequency divided by 4 in the twisted ring counters, IC105 (TCXO) and IC110 (VCXO). The slave VCXO is also fed to the synthesiser reference input.

Each twisted ring counter provides four divide-by-four outputs, the Q and not Q having the relative phases 0°, 90°, 180° and 270°. These two signals are combined in the two XOR gate phase discriminators in IC115 to provide two beat frequencies that are in phase quadrature. Both these outputs are filtered to pass the low frequency beat signal, which is a 5Vpp triangle wave.

The output from pin 8 of IC115 is then differentiated to provide a further 90° phase shifted square wave output on pin 14 of IC120. The amplitude of the output is proportional to the frequency difference between the TXCO and the VCXO. The square wave is then rectified by gating the signal with an inverted version of itself through a CMOS

switch. The switch is controlled by a square wave derived from the triangle wave on pin 7 of IC120. This square wave will either be in-phase or inverted with respect to the output on pin 14 of IC120, depending on whether the VCXO frequency is higher or lower than the TCXO frequency.

The output from the CMOS switch (pin 14 of IC150) is a direct voltage which has amplitude and sense that is relative to the beat frequency. This signal is used as the control voltage for the VCXO. The rectified signal is then summed with an inverted version of the data, which cancels the effect of the data on the loop filter but still allows the VCXO to follow the TCXO frequency. Although the VCXO and TCXO are not on the same frequency when data is being applied, the VCXO frequency will not drift with respect to the TCXO.

2.5.3 Data Path

The input data enters the radio via pin 12 of D-range 1 (PL100). The data is fed into the paging modulator at I/O pad P101, which is buffered by Q100, and then through an XOR gate (IC115 pins 2 & 3) which gives the option of inverting the data.

IC140 pins 5 & 6 translate the level of the signal to 9Vpp, and then the data passes through an attenuator and data filter. The data path is switched at the output of the filter by IC150 pins 1, 2 & 15, which allows the data to be removed from the AFC loop for testing purposes.

From the switch the data travels three paths:

- The first path is via RV100 to the LOOP-MOD output to modulate the VCO.
- The second path is through RV101 to the summing amp. This data modulates the control line of the VCXO, which produces the modulated reference.
- The third data path, which originates at the switch, is the feedforward data path. The data is inverted, attenuated by RV102 and then summed with the output of the AFC. The effect of this data path is to stop the loop filter from correcting the VCXO frequency deviation caused by the data on the data line.

2.5.4 External Reference Frequency (T837-2X-1021 Only)

The paging modulator section of the T837-2X-1021 exciter incorporates an additional synthesiser (*IC200) which can be configured to provide a 12.8MHz reference frequency from an external frequency standard. This external frequency can be from 100kHz up to 25.6MHz in 100kHz steps.

When using an external reference, you must set the onboard synthesiser's reference frequency according to the frequency of the external reference. This is achieved by placing resistors *%R240 - *%R247 in a pattern corresponding to a binary number which represents the reference divider ratio (see Section 3.6).

The internal TCXO (%X100) is used as the standard reference frequency, but is phase-locked to the external frequency when this is applied.

When there is no external reference frequency present, *Q104 is turned off and *IC160 switches 2.5V DC to the AFC input of the internal TCXO. The reference frequency can be adjusted by the trimmer on the TCXO itself.

When an external reference frequency is present, *Q104 switches on and *IC160 switches the synthesiser phase detector output voltage to the AFC input of the internal TCXO. A buffered 12.8MHz output of the internal TCXO is fed back to the synthesiser oscillator input and compared with the external reference frequency, thus ensuring that the internal TCXO is phase-locked to the external reference frequency.

The synthesiser Lock-Detect signal drives an LED *D116 on the main PCB which is lit when the synthesiser is locked to the external reference frequency. The Lock-Detect signal is also fed to pin 8 of D-range 1 (PL100) for external monitoring purposes. The output is low when the synthesiser is locked.

2.5.5 Keying Inputs

There are two ways to key the exciter:

- pulling the Tx-Key line low (pin 13 on D-range 1 [PL100]) at the rear of the set);
- via the modem carrier detect line when the optional modem PCB is fitted.

Note: Link S100 must be connected when using the Tx-Key line input.

2.5.6 Paging Modulator Links

Three solder links are provided in the paging modulator circuit. Their functions are described in the following table:

Link	Function	Standard Setting	Description
S100	Tx-Key	linked	ties the Tx-Key line to +5V for earthed Tx-Key line operation
S101	invert data	not linked	inverts the incoming data
S102	invert key	not linked	inverts the key line (connected when using modem carrier detect)

2.6 Power Supply & Regulator Circuits

(Refer to the regulators circuit diagram (sheet 6) in Section 6.2.)

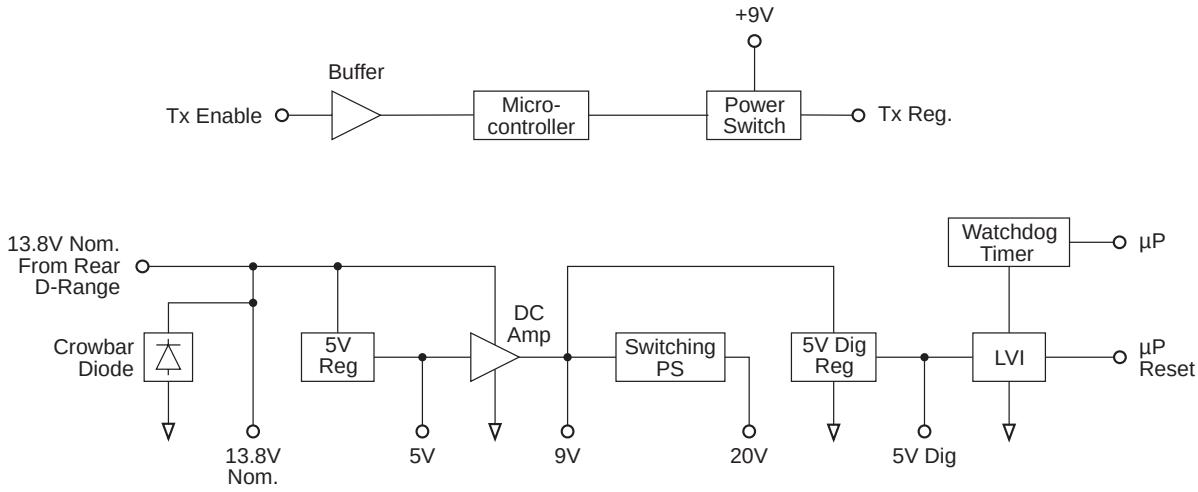


Figure 2.5 T837 Power Supply & Regulators Block Diagram

The T837 is designed to operate from a 10.8-16V DC supply (13.8V nominal). A 5.3V regulator (IC630) runs directly from the 13.8V rail, driving much of the synthesiser circuitry. It is also used as the reference for a DC amplifier (IC640, Q630, Q620) which provides a medium current capability 9V supply.

A switching power supply (Q660, Q670) runs from the 9V supply and provides a low current capability +20V supply. This is used to drive the synthesiser loop filter (IC750), giving a VCO control voltage range of up to 20V, and the Lock-Detect amplifiers.

Ultimate control of the transmitter is via the Tx-Reg. supply, switched from 9V by Q610. This is enabled via the Tx-Enable signal from the modulator, and microprocessor.

A crowbar diode is fitted for protection against connection to a power supply of incorrect polarity. It also provides transient overvoltage protection.

Note: A fuse must be fitted in the power supply line for the diode to provide effective protection.

2.7 Transmit Timers

The transmit tail timer, transmit timeout timer and transmit lockout timer can all be set from PGM800Win. The fields for setting these are found on the system information page. These three timers operate as follows (refer also to Figure 2.6):

Timer	Function	Adjustment
Transmit Tail	Sets the tail time during which the transmitter stays keyed after the external key source has been removed.	0-5 seconds in 100ms steps[a]
Transmit Timeout	Sets the maximum continuous transmission time. Once the timer has timed out, the transmitter must be keyed again, unless prevented by the transmit lockout timer.	0-300 seconds[b] in 10 second steps
Transmit Lockout	Sets the period of time that must elapse after a timeout before the transmitter can re-transmit. Once the timer has timed out, the transmitter can be keyed again.	0-60 seconds in 10 second steps

a. Adjustable in 20ms steps in PGM800Win version 2.12 and later.
b. Adjustable from 0 to 600 seconds in PGM800Win version 2.12 and later.

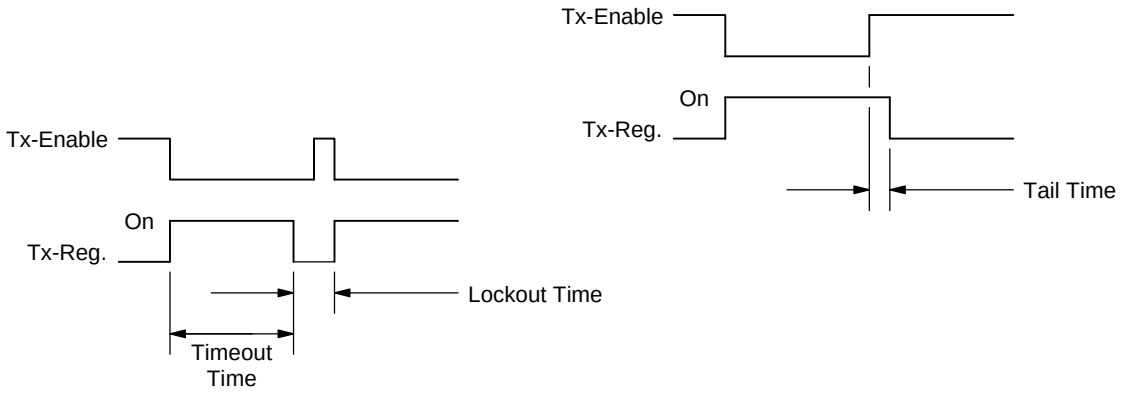


Figure 2.6 T837 Transmit Timers

2.8 Exciter Drive Amplifier

(Refer to Figure 2.1 and the exciter circuit diagram (sheet 3) in Section 6.2.)

A two-stage, wide band amplifier (Q365, Q370) provides an output level of approximately 800mW (+29dBm) for an input of 170mW (+22dBm) from the VCO. IC330 pins 5, 6 & 7, Q310, and Q315 provide a 10.5V regulated supply for the exciter.

To reduce the spurious output level when the synthesiser is out-of-lock, the Tx-Reg. and Lock-Detect signals are gated to inhibit the exciter control circuit and to switch off the RF signal at the input to the drive amplifier. This is achieved by a PIN switch attenuator (D340, D350, D360).

Cyclic keying control is provided by additional circuitry consisting of several time delay, ramp and gate stages:

- Q305, IC330 pins 5, 6 & 7 power ramping
- Q340, Q345 Tx-Reg. and $\overline{\text{Lock-Detect}}$ gate
- Q320, Q325, Q330, Q335 delay and PIN switch drive.

This is to allow the RF power circuits (both exciter and PA) to ramp up and down in a controlled manner so that minimal adjacent channel interference is generated during the transition.

R359, R342 and R344 form a 6dB attenuator to provide good VCO/drive amplifier isolation.

The output attenuator (R360, R362, R364, R366) assists in reducing exciter/PA interaction while also ensuring a good match for Q370.

Note: The exciter provides a DC control signal to the PA via the RF coax. This is injected via L390.

3 T837 Initial Tuning & Adjustment

Caution: **This equipment contains CMOS devices which are susceptible to damage from static charges. Refer to Section 1.2 in Part A for more information on anti-static procedures when handling these devices.**

The following section describes the full tuning and adjustment procedure and provides information on:

- channel programming
- synthesiser alignment
- modulator adjustment
- external reference frequency configuration (T837-2X-1021 only).

Note: Unless otherwise specified, the term "PGM800Win" used in this and following sections refers to version 2.00 and later of the software.

Refer to Section 6 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components and test points on the main PCB. The parts list and diagrams for the VCO PCB are in Part E.

3.1 Introduction

When you receive your T837 exciter it will be run up and working on a particular frequency (the "default channel")[1]. If you want to switch to a frequency that is within the 8MHz VCO switching range (i.e. ±4MHz from the factory programmed frequency), you will need to:

- reprogram the exciter with the PGM800Win software (refer to the PGM800Win programming kit and Section 3.2 below);
- carry out the modulator adjustment procedure described in Section 3.5.

However, if you want to switch to a frequency outside the 8MHz VCO switching range, you will have to:

- reprogram the exciter with the PGM800Win software;
- carry out the synthesiser alignment procedure described in Section 3.4;
- carry out the modulator adjustment procedure described in Section 3.5.

3.2 Channel Programming

You can program up to 128 channel frequencies into the exciter's EEPROM memory (IC820) by using the PGM800Win software package and an IBM™ PC. You can also use PGM800Win to select the exciter's current operating frequency (or "default channel").

If the exciter is installed in a rack frame, you can program it via the programming port in the speaker panel. However, you can also program the exciter before it is installed in a rack frame as follows:

- by using a T800-01-0010 calibration test unit;
- via D-range 1.

If you do not use the T800-01-0010, you will have to connect the PC to the exciter via a module programming interface (such as the T800-01-0004).

For a full description of the channel programming procedure, refer to the PGM800Win programming software user's manual.

1. Use the "Read Module" function in PGM800Win to find out what the default channel is.

3.3 Test Equipment Required

You will need the following test equipment:

- computer with PGM800Win installed
- T800 programming kit
- module programming interface (e.g. T800-01-0004 - optional)
- 13.8V power supply
- digital multimeter
- function generator
- RF power meter
- frequency counter } or modulation analyser
- modulation meter
- oscilloscope (digital preferred)
- 20dB pad

Figure 3.1 shows a typical test equipment set-up.

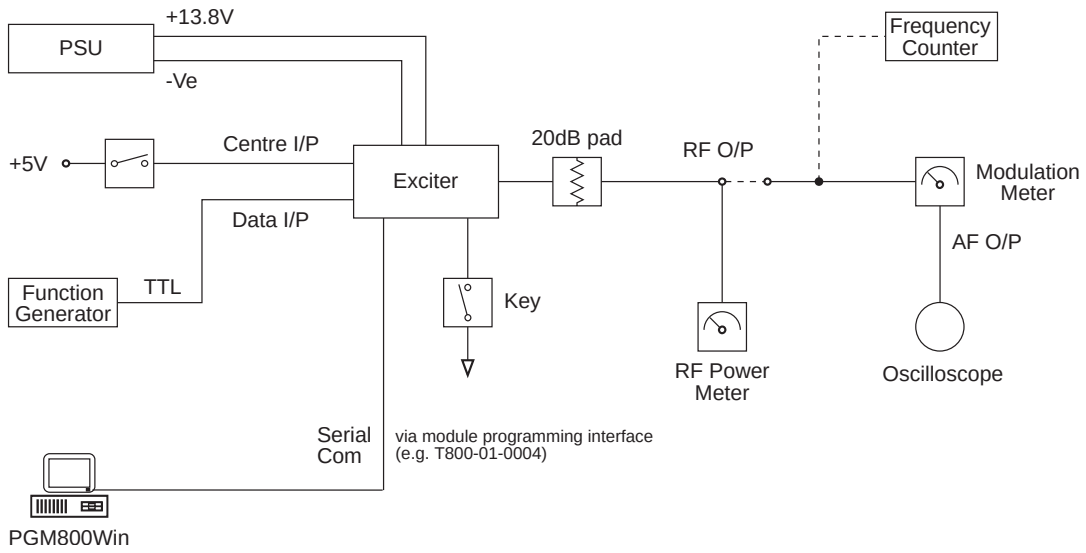


Figure 3.1 T837 Test Equipment Set-up

Note: Although the T800-01-0010 calibration test unit can be used to program the T837 paging exciter, it is not suitable for tuning and adjustment procedures because of the different pin allocations of D-range 1 (PL100).

3.4 Synthesiser Alignment

Ensure that the T837 has been programmed with the required frequencies using PGM800Win software.

Select a channel using PGM800Win.

Connect a high impedance voltmeter to PL4-1 or the junction of L1 and R1 in the VCO (this measures the synthesiser loop voltage).

Key the transmitter by earthing the Tx-Key line.

Tune VCO trimmer CV1 for a synthesiser loop voltage of 9V.

Check that the exciter output power is 800mW ±200mW (measured at the rear panel N-type connector).

If required, measure and adjust the exciter output frequency as follows:

- apply +5V DC to pin 11 of D-range 1 (PL100) - this changes the mode of operation to PLL so that the carrier frequency can be observed - and measure the output frequency at the rear panel N-type connector;
- adjust the trimmer on the TCXO (%X100) if required;
- remove the +5V DC from pin 11.

Caution: **This trimmer is susceptible to physical damage. Do not exert a downward force of more than 500g (1lb) when adjusting.**

3.5 Modulator Adjustment

Apply +5V DC to pin 12 (DATA input) of D-range 1.

Monitor the exciter output frequency and adjust RV102 (DC frequency offset) to give an output frequency of $F_{carrier}$ + 4.5kHz.

Remove the +5V DC from pin 12 and apply a 100Hz 5Vp-p square wave to pin 12.

Monitor the signal at TP100 with an AC coupled oscilloscope set to 50mV/div. and adjust RV101 (reference modulation) until the triangle wave amplitude is minimised.

Change the frequency of the square wave to 600Hz.

Monitor the frequency deviation on the exciter output with a modulation meter and adjust RV100 (VCO modulation) to obtain ±4.5kHz deviation.

Monitor the VCO control line at PL4-1 or the junction of L1 and R1 in the VCO using an AC coupled oscilloscope set to at least 20mV/div.

Change the frequency of the square wave back to 100Hz and check that the control line still has a good trapezoidal wave form with flat top and bottom.

Note 1: You may have to readjust RV101 & RV100 alternately to achieve a square wave on the VCO control line at both 600Hz and 100Hz with a deviation of ±4.5kHz. Figure 3.2 shows a typical 100Hz VCO control line wave form with RV101 and RV100 set correctly.

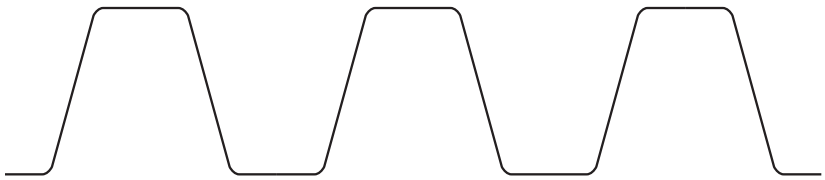


Figure 3.2 T837 100Hz VCO Control Line Wave Form

Note 2: If the lower cut off frequency of an AC coupled oscilloscope is too high, excessive distortion may be introduced which will result in 'sag' on the square wave displayed. Determine if this is a problem by directly monitoring the original square wave source and observe any sag. If there is sag, switch the oscilloscope to DC and use a 10µF capacitor in series with the oscilloscope probe (observing the correct polarity) to directly monitor the VCO control line. Note that the trace settling time will be approximately one minute.

3.6 External Reference Frequency Configuration (T837-2X-1021 Only)

When using an external reference frequency, you must set the onboard synthesiser's reference frequency according to the frequency of the external reference. This is achieved by placing resistors *%R240 - *%R247 in a pattern corresponding to a binary number which represents the reference divider ratio.

If you are using a 10MHz external reference frequency, you need only carry out steps 4 and 5 in this section. You do not need to carry out steps 1, 2 and 3 because the T837 has already been configured at the factory for a 10MHz external reference.

However, if you are using an external reference frequency other than 10MHz, you must configure the internal synthesiser as described in steps 1, 2 and 3 before proceeding to steps 4 and 5.

1. Divide the external oscillator frequency by 100kHz.

2. Convert the result to binary. You can use the following table to do this: select the binary values in row three which add up to the result obtained in step 1, then place a "1" in these positions and a "0" in the others.

MSB							LSB
N7	N6	N5	N4	N3	N2	N1	N0
128_{10}	64_{10}	32_{10}	16_{10}	8_{10}	4_{10}	2_{10}	1_{10}
*%R240	*%R241	*%R242	*%R243	*%R244	*%R245	*%R246	*%R247

3. Where there is a "0" in the binary number, place a zero ohm resistor in the corresponding component location shown in the table. Where there is a "1", leave an open link.

Example: The following example shows the resistor pattern for a 10MHz external reference frequency is calculated.

$$\frac{10\text{MHz}}{100\text{kHz}} = 100$$

$100 = 64 + 32 + 4$

therefore place resistors *%R240, *%R243, *%R244, *%R246 and *%R247 and leave all other links open

MSB							LSB
N7	N6	N5	N4	N3	N2	N1	N0
128_{10}	64_{10}	32_{10}	16_{10}	8_{10}	4_{10}	2_{10}	1_{10}
0	1	1	0	0	1	0	0
*%R240	*%R241	*%R242	*%R243	*%R244	*%R245	*%R246	*%R247

4. Connect the external reference frequency at a level of 0dBm to +10dBm/50Ω into the external reference input and check that green LED *D116 lights.

5. Measure the TCXO (%X100) AFC voltage at %IC160 pin 4 with a high impedance voltmeter and adjust the TXCO trimmer (if necessary) to obtain 2.5V DC ±0.2V.

4 T837 Functional Testing

Caution: **This equipment contains CMOS devices which are susceptible to damage from static charges. Refer to Section 1.2 in Part A for more information on anti-static procedures when handling these devices.**

The following test procedures will confirm that the T837 has been tuned and adjusted correctly and is fully operational.

Note: Unless otherwise specified, the term "PGM800Win" used in this and following sections refers to version 2.00 and later of the software.

Refer to Figure 4.2 for the location of the main tuning and adjustment controls, and to Section 3.3 for the test equipment set-up. Refer also to Section 6 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components and test points on the main PCB. The parts list and diagrams for the VCO PCB are in Part E.

The following topics are covered in this section.

4.1 Current Consumption

Connect the T837 to a 13.8V power supply.

Connect an RF power meter to the T837 output socket.

Check that the current in the 13.8V power cable is less than:

T837-2X-1020 - 150mA
T837-2X-1021 - 200mA.

Key the T837 by earthing the Tx-Key line (the carrier "On" LED should light).

Check that the current is less than 650mA.

4.2 Output Power

Connect an RF power meter to the T837 output socket.

Key the T837 by earthing the Tx-Key line.

Check that the output power is 800mW ±200mW.

4.3 Output Frequency

Connect the T837 output to a frequency counter via a 20dB attenuator pad.

Apply +5V DC to pin 11 of D-range 1 (PL100) - this changes the mode of operation to PLL so that the carrier frequency can be observed - and measure the output frequency.

Adjust the TCXO (X100) (if required) to trim to the nominal frequency (±100Hz).

4.4 External Reference Frequency (T837-2X-1021 Only)

Connect the external reference frequency at a level of 0dBm to +10dBm/50Ω into the external reference input and check that green LED *D116 lights.

Note: Ensure that the onboard synthesiser's reference frequency has been set according to the frequency of the external reference (see Section 3.6).

Check the Lock-Detect signal level on pin 8 of D-range 1 (PL100) is as follows:

external reference frequency applied - 0V (approx.)
no external reference frequency applied - 4.5V (approx.).

4.5 Timers

The transmit tail timer, transmit timeout timer and transmit lockout timer can all be set from PGM800Win. The fields for setting these are found on the system information page. These three timers operate as follows (refer also to Figure 4.1):

Timer	Function	Adjustment
Transmit Tail	Sets the tail time during which the transmitter stays keyed after the external key source has been removed.	0-5 seconds in 100ms steps[a]
Transmit Timeout	Sets the maximum continuous transmission time. Once the timer has timed out, the transmitter must be keyed again, unless prevented by the transmit lockout timer.	0-300 seconds[b] in 10 second steps
Transmit Lockout	Sets the period of time that must elapse after a timeout before the transmitter can re-transmit. Once the timer has timed out, the transmitter can be keyed again.	0-60 seconds in 10 second steps

a. Adjustable in 20ms steps in PGM800Win version 2.12 and later.
b. Adjustable from 0 to 600 seconds in PGM800Win version 2.12 and later.

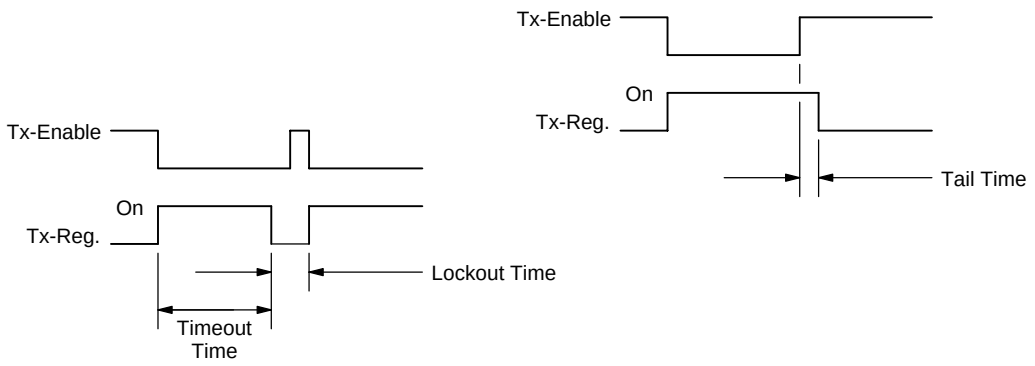


Figure 4.1 T837 Transmit Timers

5 T837 Fault Finding

Caution: **This equipment contains CMOS devices which are susceptible to damage from static charges. Refer to Section 1.2 in Part A for more information on anti-static procedures when handling these devices.**

The following test procedures and fault finding flow charts may be used to help locate a hardware problem, however they are by no means a complete fault finding procedure. If you still cannot trace the fault after progressing through them in a logical manner, contact your nearest Tait Dealer or Customer Service Organisation. If necessary, you can get additional technical help from Customer Support, Radio Systems Division, Tait Electronics Ltd, Christchurch, New Zealand (full contact details are on page 2).

Note: Unless otherwise specified, the term "PGM800Win" used in this and following sections refers to version 2.00 and later of the software.

Refer to Section 6 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components and test points on the main PCB. The parts list and diagrams for the VCO PCB are in Part E.

The following topics are covered in this section:

5.1 Visual Checks

Remove the covers from the T837 and inspect the PCB for damaged or broken components, paying particular attention to the surface mounted devices (SMD's).

Check for defective solder joints. If repair or replacement is considered necessary, refer to Section 3 of Part A.

5.2 Component Checks

If you suspect a transistor is faulty, you can assess its performance by measuring the forward and reverse resistance of the junctions. Unless the device is completely desoldered, first make sure that the transistor is not shunted by some circuit resistance. Use a good quality EVM (e.g. Fluke 75) for taking the measurements (or a 20k ohm/V or better multimeter, using only the medium or low resistance ranges).

The collector current drawn by multi-junction transistors is a further guide to their performance.

If an IC is suspect, the most reliable check is to measure the DC operating voltages. Due to the catastrophic nature of most IC failures, the pin voltages will usually be markedly different from the recommended values in the presence of a fault. The recommended values can be obtained from either the circuit diagram or the component data catalogue.

5.3 Front Panel LED Indicator

The green "Supply" LED on the T837 front panel will flash according to the conditions described in the following table:

Flash Rate	Condition
fast (⅓ sec. on/⅓ sec. off approx.)	T837 is linked with PGM800Win
unequal (⅓ sec. on/1 sec. off approx.)	microcontroller has detected an internal communications error - refer to Section 5.7.1

Where two or more conditions occur at the same time, the precedence is in the order shown above (i.e. T837 linked has the highest priority, followed by internal error).

5.4 DC Checks

5.4.1 Power Rails

Refer to the top side PCB layout diagram in Section 6 or Figure 4.2 for test point locations, and to the regulator fault finding chart (Section 5.7.2) for fault diagnosis.

Check the 13.8V (TP601) and 9V (TP602) supplies at their test points in the regulator compartment with a DMM.

Check the 5V (TP604) and 20V (TP603) rails at their respective test points in the regulator compartment.

Check that Tx-Reg. (TP310 in the paging modulator compartment) comes up to 8.8V when the exciter is keyed.

Check the +5V digital regulator output (TP607 in the regulator compartment).

Check for short circuits.

5.4.2 VCO Locking

Key the exciter.

Using a DMM, monitor the VCO control voltage at PL4-1 or the junction of L1 and R1 on the VCO PCB.

If the synthesiser is locked and the VCO aligned, the voltage at this point should be between 5 and 13V.

If the VCO is not locked, refer to the synthesiser fault finding chart (Section 5.7.3).

5.5 RF Checks

In-circuit RF levels may be measured with an RF probe on which the earth lead has been shortened to a minimum (i.e. 13mm). Refer to the circuit diagrams for typical levels.

Figure 5.1 shows a suitable RF probe circuit.

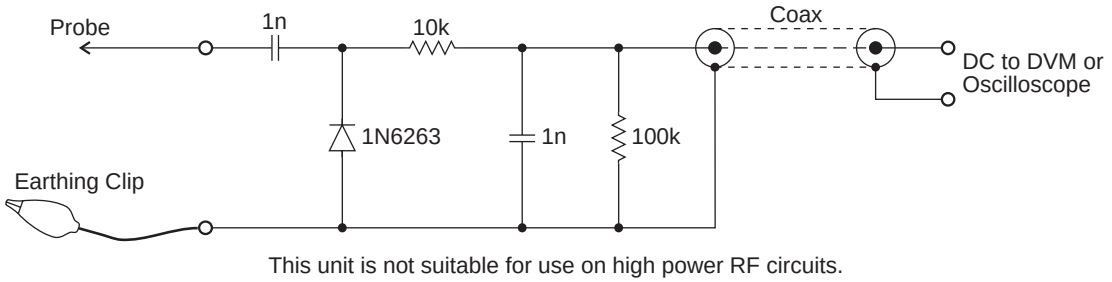


Figure 5.1 RF Diode Probe Circuit

5.5.1 Output Power

Refer to the exciter drive amplifier fault finding chart (Section 5.7.4).

Ensure that the VCO locks (refer to Section 5.4.2).

Connect the exciter output to a power meter and key the exciter.

Check that the output power is between 600 and 1000mW.

Note: If the synthesiser is out of lock, the lock detector (synthesiser IC740 and comparator IC750) will prevent the RF signal from reaching the PA by switching the supply to the exciter amplifier (Q340, Q345).

5.6 PGM800Win Generated Errors

The following errors are those most likely to occur using PGM800Win. Refer to the PGM800Win software user's manual for a complete list of error messages.

Channel Switch Set

The programmed default channel change was not accepted by the base station because a channel is selected externally. Try turning the external channel switch off to change the default channel in PGM800Win.

Synth Out Of Lock

The synthesiser received incorrect data, or the data was corrupted. Enter a frequency within the VCO switching range, or tune the VCO.

Internal Error

Data could not be read from the base station due to an internal error. Check for shorts or open circuits on the SDA, SCK, SYNTH and EPOT lines. The SDA, SCK and SYNTH are normally high.

Write/Read To An Unlinked Module

The link to the module does not exist. Undefined error.

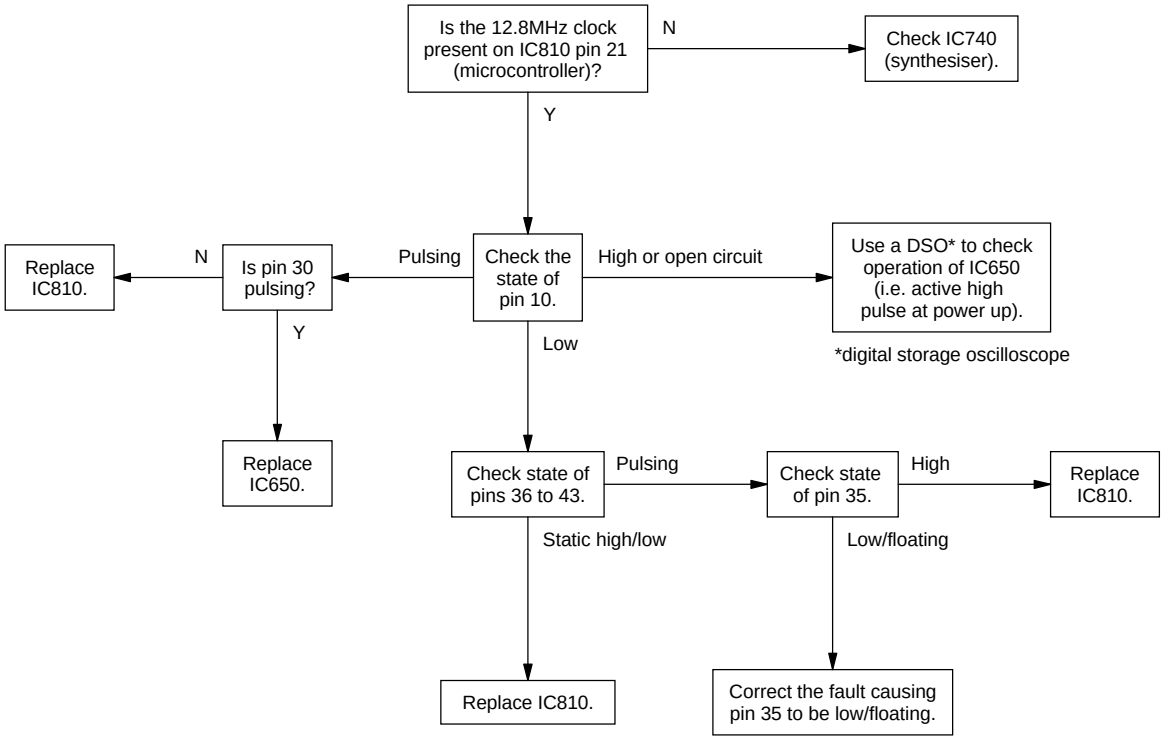
5.7 Fault Finding Charts

Note: The standard test point designations used in this section are as follows:

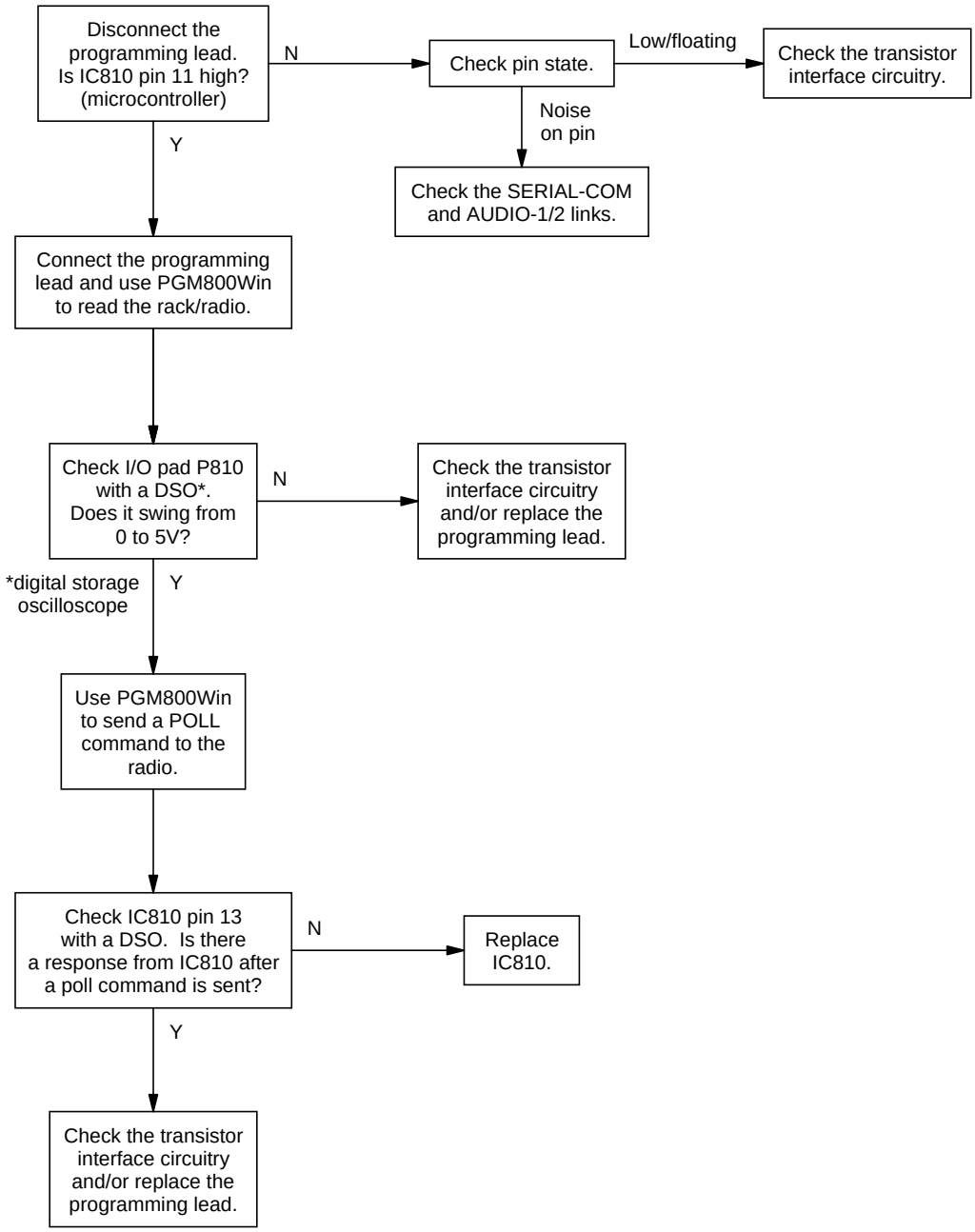
TP601	13.8V
TP602	9V
TP603	20V
TP604	5V

5.7.1 Microcontroller (IC810)

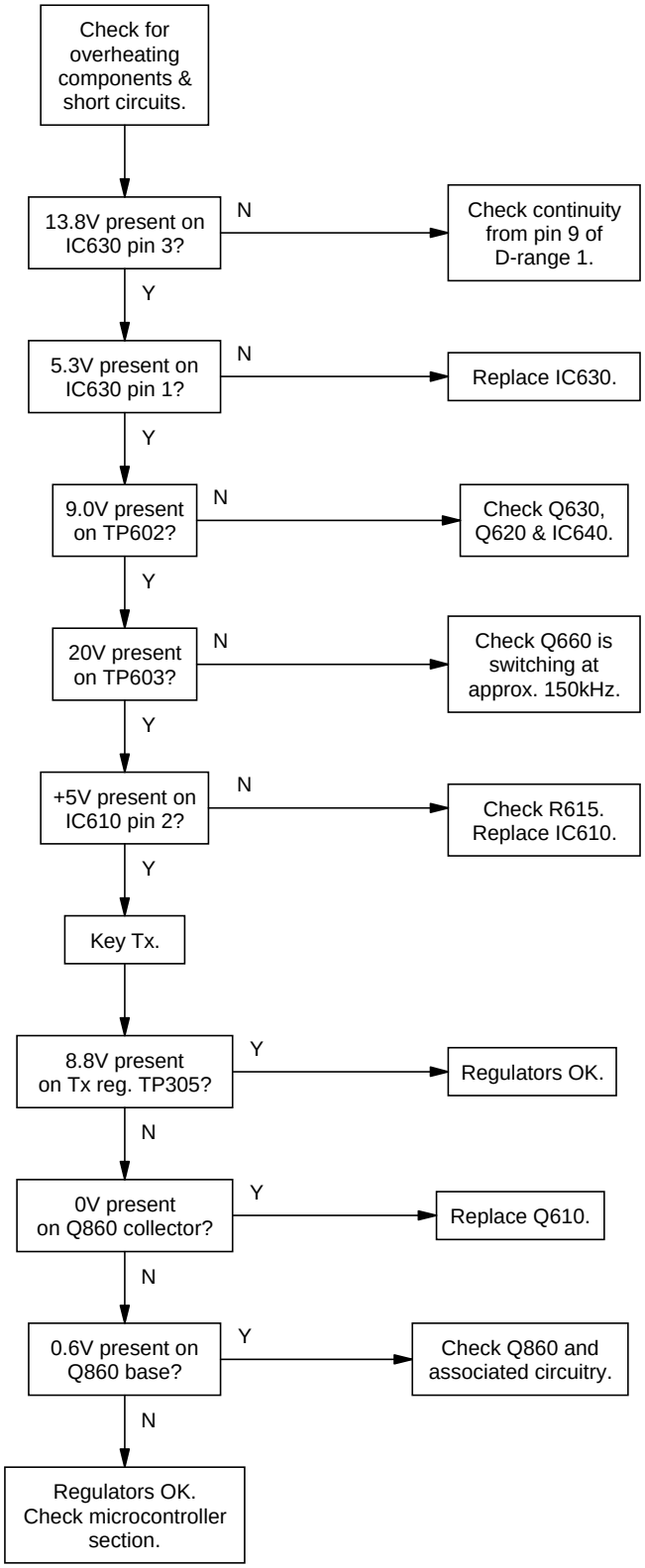
5.7.1.1 Basic Checks



5.7.1.2 Serial Communication

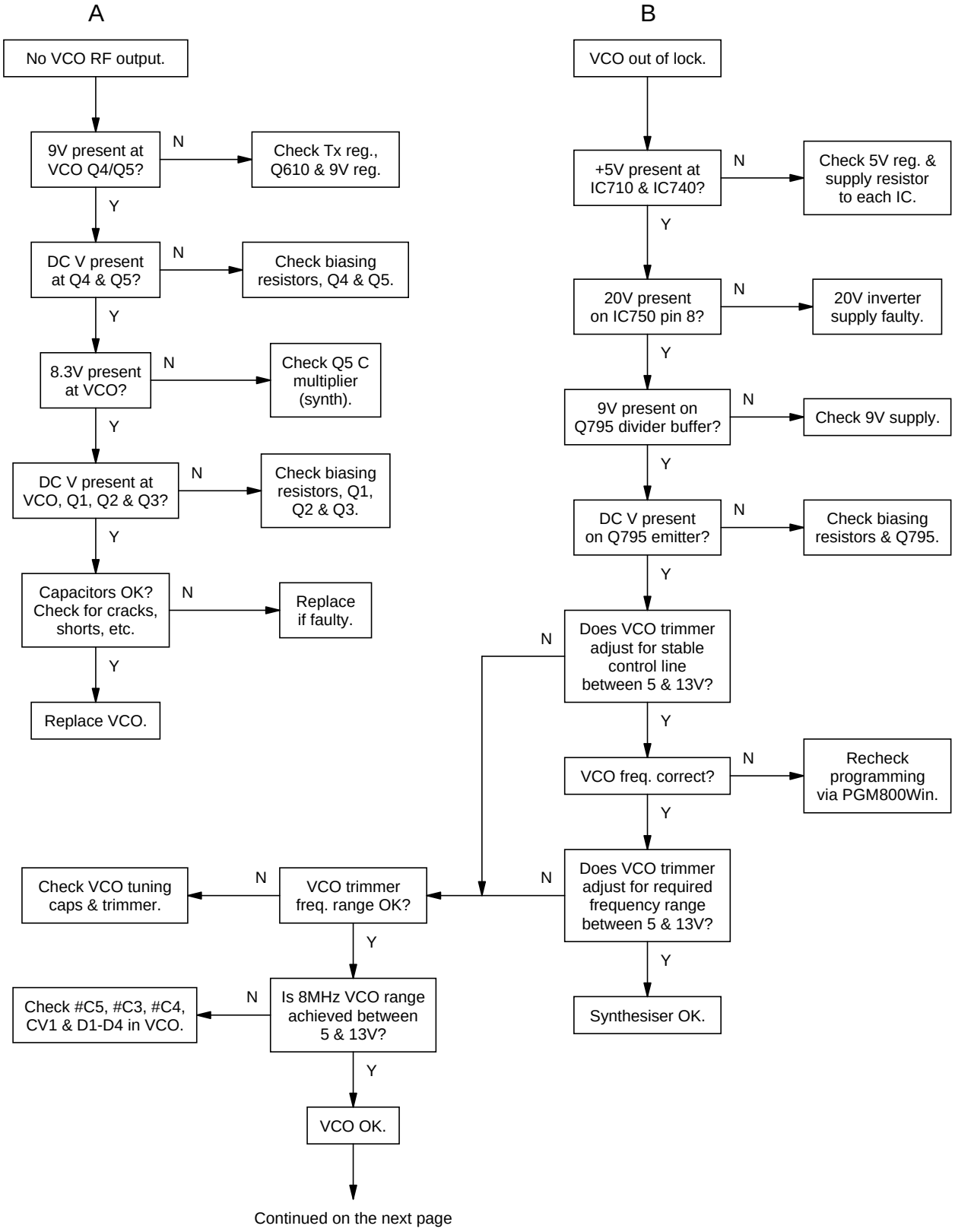


5.7.2 Regulator

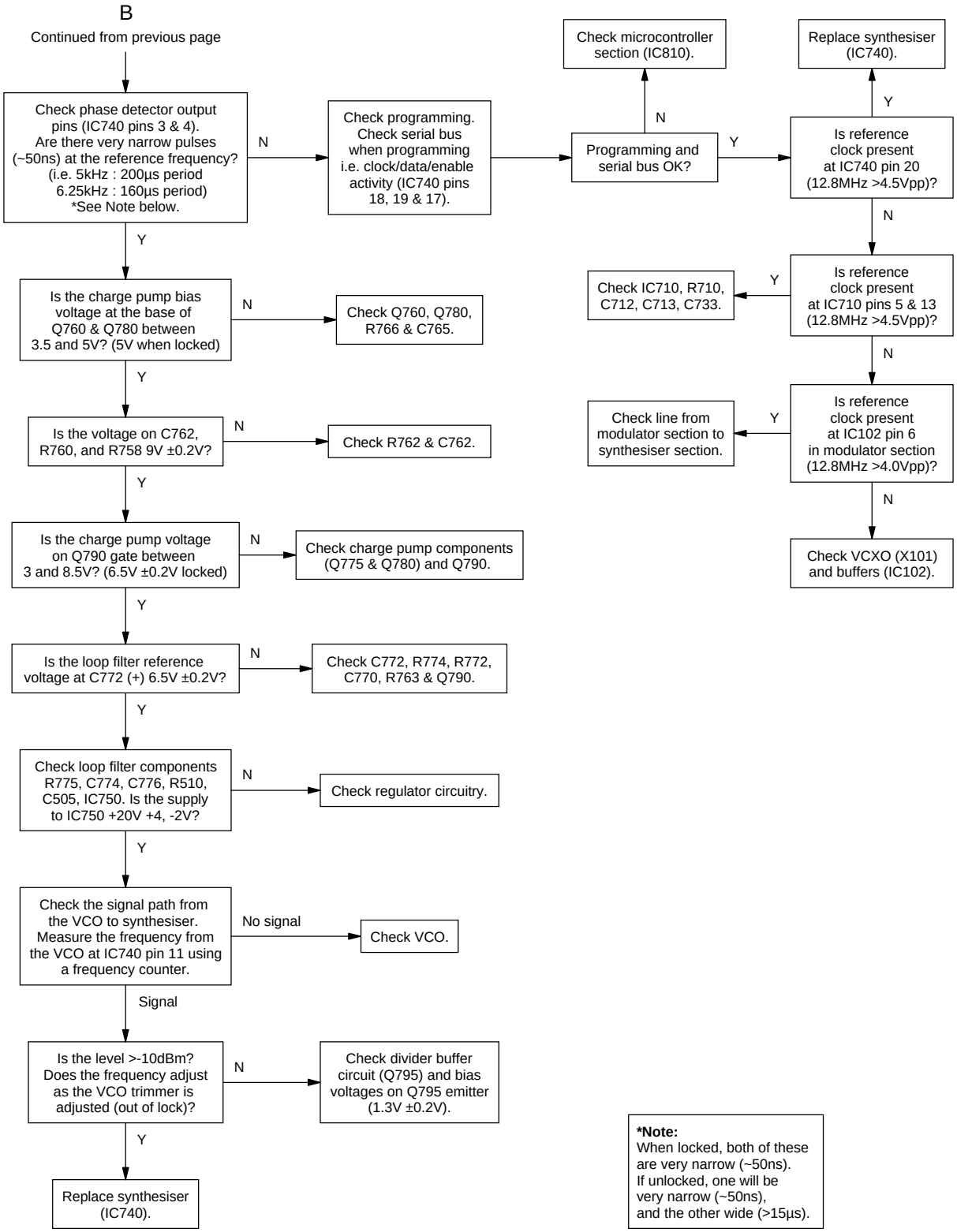


5.7.3 Synthesiser

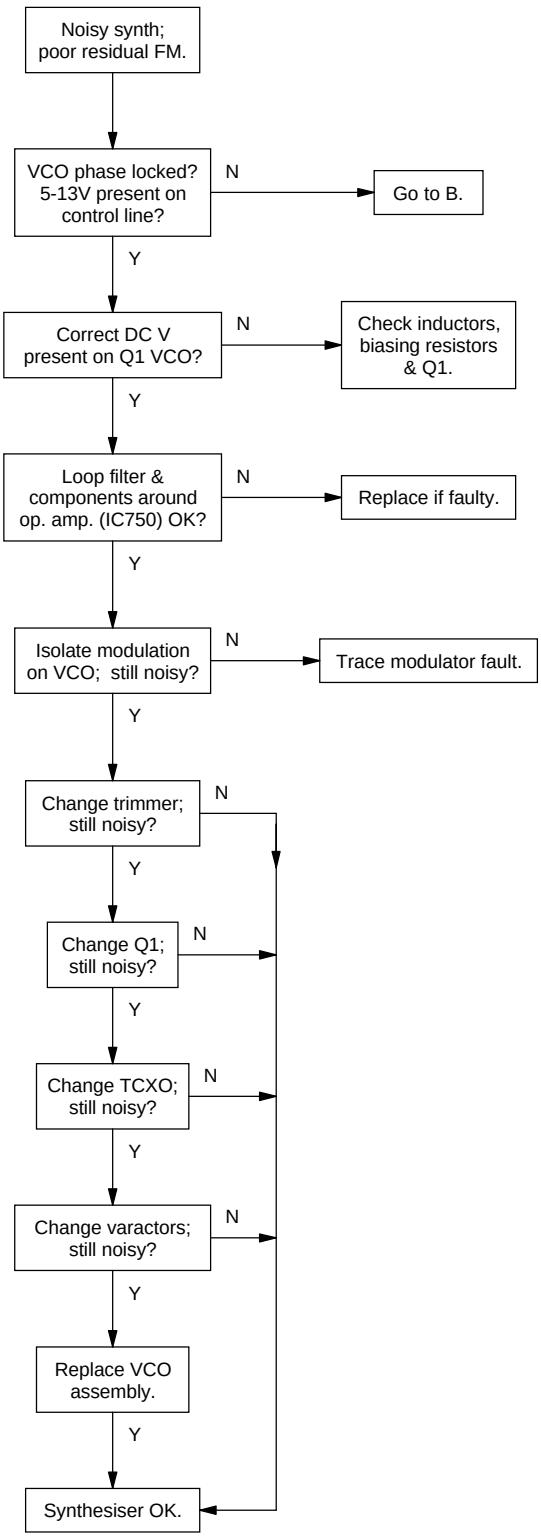
Refer to the synthesiser circuit diagram (sheet 7) in Section 6 and the VCO circuit diagram in Part E.



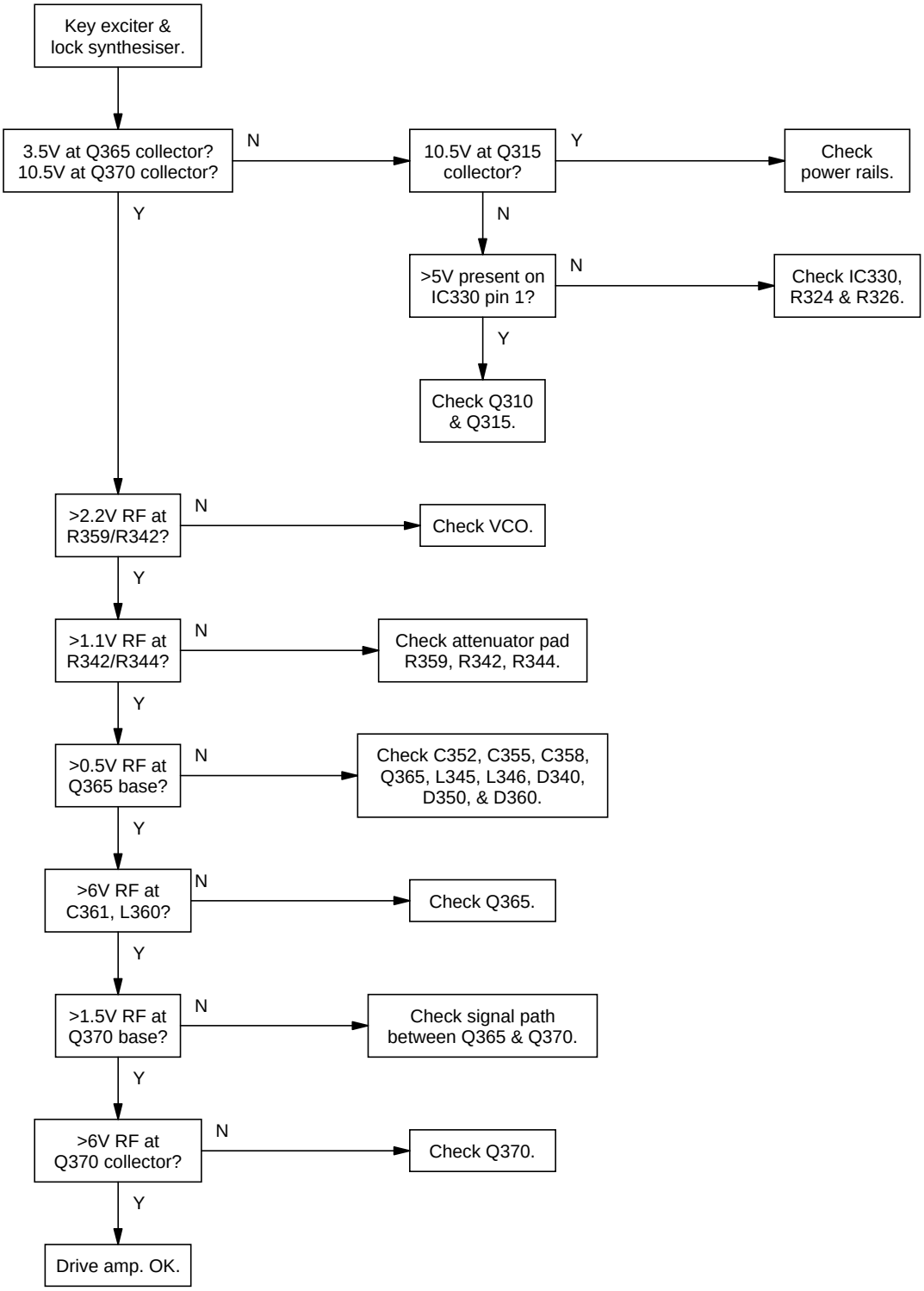
Continued on the next page


B
Continued from previous page
Check phase detector output pins (IC740 pins 3 & 4). Are there very narrow pulses (~50ns) at the reference frequency? (i.e. 5kHz : 200µs period 6.25kHz : 160µs period) *See Note below.
N
Check programming. Check serial bus when programming i.e. clock/data/enable activity (IC740 pins 18, 19 & 17).
Check microcontroller section (IC810).
N
Programming and serial bus OK?
Y
Replace synthesiser (IC740).
Y
Is reference clock present at IC740 pin 20 (12.8MHz >4.5Vpp)?
N
Y
Check IC710, R710, C712, C713, C733.
Is reference clock present at IC710 pins 5 & 13 (12.8MHz >4.5Vpp)?
N
Y
Check line from modulator section to synthesiser section.
Is reference clock present at IC102 pin 6 in modulator section (12.8MHz >4.0Vpp)?
N
Check VCXO (X101) and buffers (IC102).
Y
Is the charge pump bias voltage at the base of Q760 & Q780 between 3.5 and 5V? (5V when locked)
N
Check Q760, Q780, R766 & C765.
Y
Is the voltage on C762, R760, and R758 9V ±0.2V?
N
Check R762 & C762.
Y
Is the charge pump voltage on Q790 gate between 3 and 8.5V? (6.5V ±0.2V locked)
N
Check charge pump components (Q775 & Q780) and Q790.
Y
Is the loop filter reference voltage at C772 (+) 6.5V ±0.2V?
N
Check C772, R774, R772, C770, R763 & Q790.
Y
Check loop filter components R775, C774, C776, R510, C505, IC750. Is the supply to IC750 +20V +4, -2V?
N
Check regulator circuitry.
Y
Check the signal path from the VCO to synthesiser. Measure the frequency from the VCO at IC740 pin 11 using a frequency counter.
No signal
Check VCO.
Signal
Is the level >-10dBm? Does the frequency adjust as the VCO trimmer is adjusted (out of lock)?
N
Check divider buffer circuit (Q795) and bias voltages on Q795 emitter (1.3V ±0.2V).
Y
Replace synthesiser (IC740).
***Note:**
When locked, both of these are very narrow (~50ns).
If unlocked, one will be very narrow (~50ns), and the other wide (>15µs).

C



5.7.4 Exciter Drive Amplifier



6 T837 PCB Information

Caution: **This equipment contains CMOS devices which are susceptible to damage from static charges. Refer to Section 1.2 in Part A for more information on anti-static procedures when handling these devices.**

This section provides the following information on the T837 paging exciter:

- parts lists
- grid reference index
- PCB layouts
- circuit diagrams.

6.1 Introduction

Product Type Identification

You can identify the exciter type by checking the product code printed on a label on the rear of the chassis (product codes are explained in Section 1.3 in this Part of the manual, and Figure 1.1 in Part A shows typical labels). You can further verify the product type by checking the placement of an SMD resistor in the table that is screen printed onto the top side of the PCB, similar to the example drawn below. In this example, the resistor indicates that the product was built as a T837-20-XXXX.

837-	
837-	
837-	
PRODUCT TYPE	

PRODUCT TYPE	
837-10	837-20
837-13	837-23
837-15	837-25

Note: The only function of this resistor is to indicate the product type. It has no effect on the circuitry or operation of the exciter.

PCB Identification

All PCBs are identified by a unique 10 digit "internal part number" (IPN), e.g. 220-12345-00, which is screen printed onto the PCB (usually on the top side), as shown in the example below:

The last 2 digits of this number define the issue status, which starts at 00 and increments through 01, 02, 03, etc. as the PCB is updated. Some issue PCBs never reach full production status and are therefore not included in this manual. A letter following the 10 digit IPN has no relevance in identifying the PCB for service purposes.

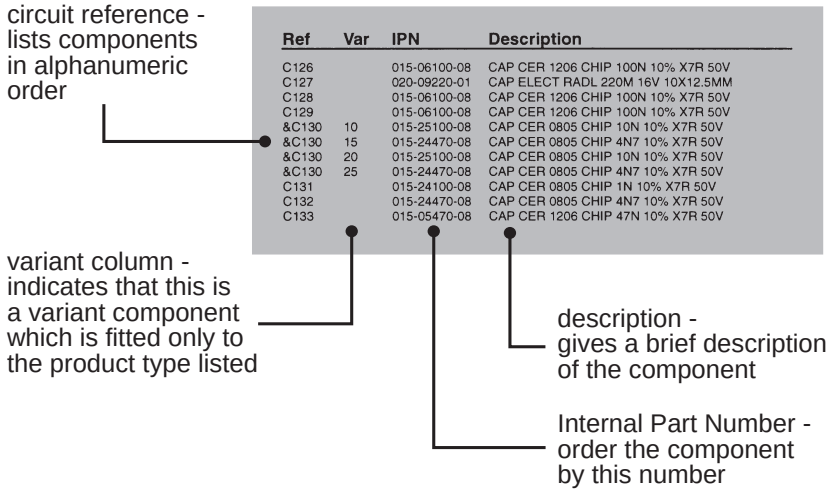
Note: It is important that you identify which issue PCB you are working on so that you can refer to the appropriate set of PCB information.

Parts Lists

The 10 digit numbers (000-00000-00) in this Parts List are "internal part numbers" (IPNs). We can process your spare parts orders more efficiently and accurately if you quote the IPN and provide a brief description of the part.

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

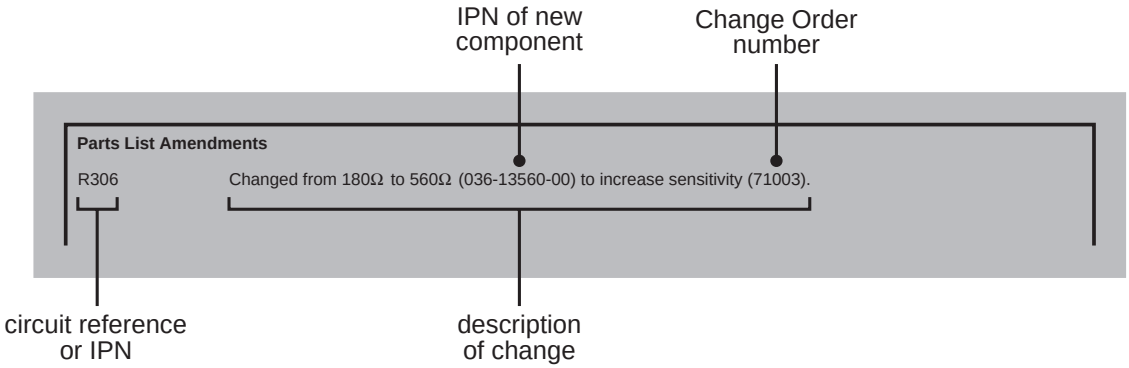
Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns, as shown below:



The mechanical and miscellaneous section lists the variant and common parts in IPN order.

Parts List Amendments

At the front of the parts list is the Parts List Amendments box (an example of which is shown below). This box contains a list of component changes which took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order. The number in brackets at the end of each entry refers to the Tait internal Change Order document.



Variant Components

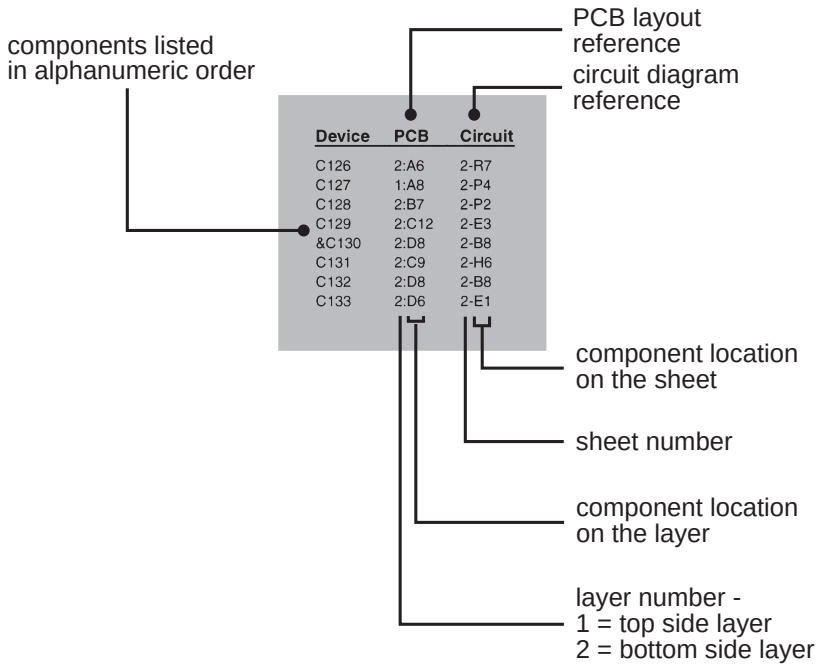
A variant component is one that has the same circuit reference but different value or specification in different product types. Where two products share the same PCB, the term "variant" is also used to describe components unplaced in one product. Variant components have a character prefix, such as "&", "=" or "#", before the circuit reference (e.g. &R100).

The table below explains the variant prefixes used in T800 Series II products:

If the variant prefix is. . .	the component will. . .
&	change according to channel spacing
=	change according to frequency stability
#	change according to frequency range
%	change or be placed/unplaced for special applications
*	be unplaced in one product (where two products share the same PCB)

Grid Reference Index

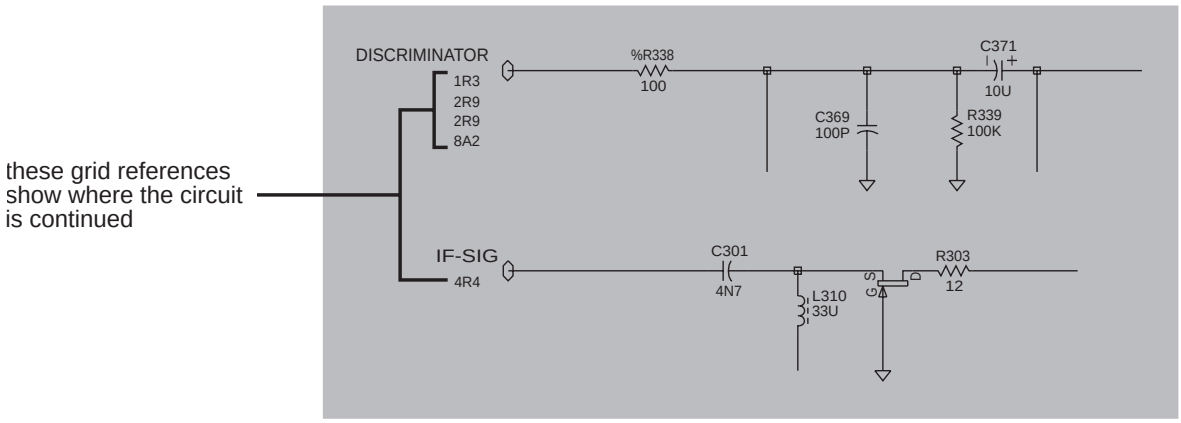
This section contains a component grid reference index to help you find components and labelled pads on the PCB layouts and circuit diagrams. This index lists the components and pads in alphanumeric order, along with the appropriate alphanumeric grid references, as shown below:



Using CAD Circuit Diagrams

Reading a CAD circuit diagram is similar to reading a road map, in that both have an alphanumeric border. The circuit diagrams in this manual use letters to represent the horizontal axis, and numbers for the vertical axis. These circuit diagram "grid references" are useful in following a circuit that is spread over two or more sheets.

When a line representing part of the circuitry is discontinued, a reference will be given at the end of the line to indicate where the rest of the circuitry is located, as shown below. The first digit refers to the sheet number and the last two characters refer to the location on that sheet of the continuation of the circuit (e.g. 1R3).



6.2 T837 Paging Exciter PCB

This section contains the following information.

T837 Parts List (IPN 220-01585-01)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped in alphabetical order and then in numerical order within each group. Each component entry comprises three or four columns: the circuit reference, variant (if applicable), IPN and description. A number in the variant column indicates that this is a variant component which is fitted only to the product type listed. Static sensitive devices are indicated by an (S) at the start of the description column.

The miscellaneous and mechanical section lists the variant and common parts in IPN order. Where possible, a number in the legend column indicates their position in the mechanical assembly drawing.

The Parts List Amendments box below lists component changes that took place after the parts list and diagrams in this section were compiled. These changes (e.g. value changes, added/deleted components, etc.) are listed by circuit reference in alphanumeric order and supersede the information given in the parts list or diagrams. Components without circuit references are listed in IPN order.

Parts List Amendments

There were no amendments to the parts list at the time of publication.

Parts List Amendments - Continued

This page is provided for entering future amendments to the parts list.

Note: The T837-2X-1020 and T837-2X-1021 share the same basic design and are built on the same PCB. However, there are a number of special variant components in these products.

The "*" variant prefix is used to indicate those components which are placed only in the T837-2X-1021.

The "%" prefix indicates components which are placed in all product types, but may have different values in each product type.

The "*%" prefixes indicate components which are optional in the T837-2X-1021 only, and not placed at all in the T837-2X-1020.

Ref	Var	IPN	Description
C100		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C101		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C102		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C103		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C104		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C105		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C106		015-24100-08	CAP CER 0805 1N 10% X7R 50V
*C107	20-1021	015-25470-08	CAP CER 0805 47N 10% X7R 50V
*C107	26-1021	015-25470-08	CAP CER 0805 47N 10% X7R 50V
C108		015-21820-02	CAP 0805 8P2 0.1 NPO 50V
C109		015-22470-01	CAP CER 0805 47P 5% NPO 50V
*C110	20-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C110	26-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C111	20-1021	015-24100-08	CAP CER 0805 1N 10% X7R 50V
*C111	26-1021	015-24100-08	CAP CER 0805 1N 10% X7R 50V
C112		015-24100-08	CAP CER 0805 1N 10% X7R 50V
%C113	20-1020	015-25100-08	CAP CER 0805 10N 10% X7R 50V
%C113	20-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
%C113	26-1020	015-24680-08	CAP CER 0805 6N8 10% X7R 50V
%C113	26-1021	015-24680-08	CAP CER 0805 6N8 10% X7R 50V
C115		015-21820-02	CAP 0805 8P2 0.1 NPO 50V
*C122	20-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C122	26-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
C123		015-24100-08	CAP CER 0805 1N 10% X7R 50V
*C124	20-1021	015-24100-08	CAP CER 0805 1N 10% X7R 50V
*C124	26-1021	015-24100-08	CAP CER 0805 1N 10% X7R 50V
%C125	20-1020	015-24220-08	CAP CER 0805 2N2 10% X7R 50V
%C125	20-1021	015-24220-08	CAP CER 0805 2N2 10% X7R 50V
*C126	20-1021	015-24100-08	CAP CER 0805 1N 10% X7R 50V
*C126	26-1021	015-24100-08	CAP CER 0805 1N 10% X7R 50V
*C127	20-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C127	26-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
%C128	20-1020	015-24100-08	CAP CER 0805 1N 10% X7R 50V
%C128	20-1021	015-24100-08	CAP CER 0805 1N 10% X7R 50V
%C128	26-1020	015-24100-08	CAP CER 0805 1N 10% X7R 50V
%C128	26-1021	015-24100-08	CAP CER 0805 1N 10% X7R 50V
%C129	20-1020	015-25220-08	CAP CER 0805 22N 10% X7R 50V
%C129	20-1021	015-25220-08	CAP CER 0805 22N 10% X7R 50V
%C129	26-1020	015-24220-08	CAP CER 0805 2N2 10% X7R 50V
%C129	26-1021	015-24220-08	CAP CER 0805 2N2 10% X7R 50V
*C130	20-1021	014-08100-00	CAP TANT CHIP 10M 16VW +-20%
*C130	26-1021	014-08100-00	CAP TANT CHIP 10M 16VW +-20%
*C131	20-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C131	26-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C132	20-1021	014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
*C132	26-1021	014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
*C133	20-1021	015-24470-08	CAP CER 0805 4N7 10% X7R 50V
*C133	26-1021	015-24470-08	CAP CER 0805 4N7 10% X7R 50V
*C134	20-1021	013-06100-10	CAP SMD PPS 100N 100V 10%
*C134	26-1021	013-06100-10	CAP SMD PPS 100N 100V 10%
*C135	20-1021	015-24470-08	CAP CER 0805 4N7 10% X7R 50V
*C135	26-1021	015-24470-08	CAP CER 0805 4N7 10% X7R 50V
*%C136	20-1021	015-24100-08	CAP CER 0805 1N 10% X7R 50V
*%C136	26-1020	015-24100-08	CAP CER 0805 1N 10% X7R 50V
*%C136	26-1021	015-24100-08	CAP CER 0805 1N 10% X7R 50V
%C137	20-1020	036-10000-00	RES M/F 0805 ZERO OHM
%C137	20-1021	015-24680-08	CAP CER 0805 6N8 10% X7R 50V
%C137	26-1020	015-24680-08	CAP CER 0805 6N8 10% X7R 50V
%C137	26-1021	015-24680-08	CAP CER 0805 6N8 10% X7R 50V
C138		015-24330-08	CAP CER 0805 3N3 10% X7R 50V
C139		015-24330-08	CAP CER 0805 3N3 10% X7R 50V
*C140	20-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C140	26-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
C141		015-24220-08	CAP CER 0805 2N2 10% X7R 50V
C142		015-24220-08	CAP CER 0805 2N2 10% X7R 50V
*C143	20-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C143	26-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
C144		015-23100-01	CAP CER 0805 100P 5% NPO 50V
*C145	20-1021	014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
*C145	26-1021	014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
*C146	20-1021	014-08100-00	CAP TANT CHIP 10M 16VW +-20%
*C146	26-1021	014-08100-00	CAP TANT CHIP 10M 16VW +-20%
*C147	20-1021	015-06100-08	CAP CER 1206 100N 10% X7R 50V
*C147	26-1021	015-06100-08	CAP CER 1206 100N 10% X7R 50V
C148		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C149		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C150		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C151		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C152		013-06470-00	CAP SMD POLYESTER 470N 63V 10%
C153		013-06470-00	CAP SMD POLYESTER 470N 63V 10%
C154		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C155		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C156		015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C157	20-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C157	26-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
C158		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C159		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C160		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C161		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C162		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C163		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C164		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
*C165	20-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
*C165	26-1021	015-25100-08	CAP CER 0805 10N 10% X7R 50V
C166		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C167		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C168		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
*C169	20-1021	014-08100-00	CAP TANT CHIP 10M 16VW +-20%
*C169	26-1021	014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C170		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
*C171	20-1021	014-08100-00	CAP TANT CHIP 10M 16VW +-20%
*C171	26-1020	014-08100-00	CAP TANT CHIP 10M 16VW +-20%
*C171	26-1021	014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C172		015-06100-08	CAP CER 1206 100N 10% X7R 50V
*C173	20-1021	015-06100-08	CAP CER 1206 100N 10% X7R 50V
*C173	26-1020	015-06100-08	CAP CER 1206 100N 10% X7R 50V
*C173	26-1021	015-06100-08	CAP CER 1206 100N 10% X7R 50V
C301		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C304		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C307		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C309		015-23680-08	CAP CER 0805 680P 10% X7R 50V
C310		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C313		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C317		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C318		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C319		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C325		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C328		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C330A		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C330B		014-08100-03	CAP TANT SMD 10U 35V 20%
C331		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C334		014-07470-04	CAP TANT SMD 4U7 50V 20%
C337		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C340		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C343		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C346		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C349		015-23150-01	CAP CER 0805 150P 5% NPO 50V
C352		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C355		015-22330-01	CAP CER 0805 33P 5% NPO 50V
C358		015-22820-01	CAP CER 0805 82P 5% NPO 50V
C361		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C376		015-04100-04	CAP CER 1206 1N 10% X7R 50V
C379		015-04100-04	CAP CER 1206 1N 10% X7R 50V
C382		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C383		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C384		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C385		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C388		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C390		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C391		015-21820-02	CAP 0805 8P2 0.1 NPO 50V
C392		015-25220-08	CAP CER 0805 22N 10% X7R 50V
C393		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C394		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C395		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C397		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C398		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C503		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C505		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C510		015-25220-08	CAP CER 0805 22N 10% X7R 50V
C513		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C535		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C550		014-08220-01	CAP TANT 22UF 10V 276MSER
C605		015-23120-01	CAP CER 0805 120P 5% NPO 50V
C610A		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C610B		014-09100-00	CAP TANT SMD 100U 16V 20%
C611A		014-09100-00	CAP TANT SMD 100U 16V 20%
C611B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C623		015-23120-01	CAP CER 0805 120P 5% NPO 50V
C625		020-09470-07	CAP ELEC RADL 470M 16V 20% 3.5
C626		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C628		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C630		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C631		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C634		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C636		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C638		015-23120-01	CAP CER 0805 120P 5% NPO 50V
C640		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C660		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C665		014-08100-03	CAP TANT SMD 10U 35V 20%
C670		014-07330-10	CAP TANT SMD 3U3 35V 10%

Ref	Var	IPN	Description
C673		015-24470-08	CAP CER 0805 4N7 10% X7R 50V
C677		014-07100-02	CAP TANT CHIP 1U0 3.2X1.6M 16V
C681		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C684		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C687		015-23120-01	CAP CER 0805 120P 5% NPO 50V
C690		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C693		014-08100-00	CAP TANT CHIP 10M 16VW +-20%
C706		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C708		014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
C709		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C710		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C712		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C713		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C714		014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
C733		015-21470-01	CAP CER 0805 4P7+-0.25 NPO 50V
C735		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C736		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C740A		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C740B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C741A		014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
C741B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C742A		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C742B		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C743		015-22470-01	CAP CER 0805 47P 5% NPO 50V
C745		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C750		014-08100-03	CAP TANT SMD 10U 35V 20%
C757		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C759		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C761		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C762		014-08220-01	CAP TANT 22UF 10V 276MSER
C764		015-25100-08	CAP CER 0805 10N 10% X7R 50V
C765		014-07470-01	CAP 4U7 'B'CASE 25V +-10% 267
C767		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C769		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C770		014-08220-01	CAP TANT 22UF 10V 276MSER
C772		014-08220-01	CAP TANT 22UF 10V 276MSER
C774		013-06330-11	CAP SMD PPS 330N 63V 5%
C776		015-25150-08	CAP CER 0805 15N 10% X7R 50V
C782		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C784		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C786		015-06100-08	CAP CER 1206 100N 10% X7R 50V
C788		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C790		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C792		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C810		015-25470-08	CAP CER 0805 47N 10% X7R 50V
C812		015-23100-01	CAP CER 0805 100P 5% NPO 50V
C813		015-24100-08	CAP CER 0805 1N 10% X7R 50V
C910		015-02120-06	CAP CER 1210 12P NPO500VGRM42
C920		015-02270-06	CAP CER 1210 27P NPO 500V
C930		015-02120-06	CAP CER 1210 12P NPO500VGRM42
%D1	20-1020	001-10015-50	DIODE SMD ZENER 1.5SMC22AT3
%D1	20-1021	001-10015-50	DIODE SMD ZENER 1.5SMC22AT3
%D1	26-1020	001-10015-50	DIODE SMD ZENER 1.5SMC22AT3
%D1	26-1021	001-10015-50	DIODE SMD ZENER 1.5SMC22AT3
*D100	20-1021	001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
*D100	26-1021	001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D105		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
*D116	20-1021	008-10067-03	S) LED SMD GRN LGT670-HK
*D116	26-1021	008-10067-03	S) LED SMD GRN LGT670-HK
D119		008-00014-80	S)LED 3MM GREEN WITH WIRE
D120		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D125		008-00014-79	S)LED 3MM RED WITH WIRE
D130		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D135		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D140		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D160		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
*D200	20-1021	001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
*D200	26-1021	001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
*D220	20-1021	001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
*D220	26-1021	001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
D340		001-10000-18	S) DIODE SMD BAT18 S-SW SOT23
D350		001-10000-18	S) DIODE SMD BAT18 S-SW SOT23
D360		001-10000-18	S) DIODE SMD BAT18 S-SW SOT23
D370		001-10010-40	DIODE SMD ZENER 33V BZG03-C33
D610		001-10000-99	S) DIODE SMD BAV99 D-SW SOT23
D640		001-10000-70	S) DIODE SMD BAV70 D-SW SOT23
D645		001-10010-40	DIODE SMD ZENER 33V BZG03-C33
D730		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
D740		001-10165-00	DIODE BAT165 SCHOTTKY SOD-323
IC100		002-74910-04	S) IC SMD 74HCU04 6X INV
IC102		002-74910-04	S) IC SMD 74HCU04 6X INV
IC105		002-74901-09	S) IC SMD 74HC109 DUAL JK F/F
IC110		002-74901-09	S) IC SMD 74HC109 DUAL JK F/F
IC115		002-74900-86	S) IC SMD 74HC86 EX OR SO14
IC120		002-10006-60	S) IC SMD LMC660CM O-AMP 4X
IC125		002-10006-60	S) IC SMD LMC660CM O-AMP 4X
IC140		002-10041-04	S) IC SMD 4104 4X VOLT SHIFTER
IC150		002-10040-53	S)IC 4053B SMD BREAK B4 MAKE
*IC160	20-1021	002-10040-53	S)IC 4053B SMD BREAK B4 MAKE
*IC160	26-1021	002-10040-53	S)IC 4053B SMD BREAK B4 MAKE
*IC200	20-1021	002-14515-00	LIM)IC MC145151DW2 SYNTH P-IP
*IC200	26-1021	002-14515-00	LIM)IC MC145151DW2 SYNTH P-IP
*IC210	20-1021	002-10006-62	S)IC SMD LMC662CM 2X O-AMP
*IC210	26-1021	002-10006-62	S)IC SMD LMC662CM 2X O-AMP
*IC220	20-1021	002-74910-04	S) IC SMD 74HCU04 6X INV
*IC220	26-1021	002-74910-04	S) IC SMD 74HCU04 6X INV

Ref	Var	IPN	Description
*IC230	20-1021	002-10006-62	S)IC SMD LMC662CM 2X O-AMP
*IC230	26-1020	002-10006-62	S)IC SMD LMC662CM 2X O-AMP
*IC230	26-1021	002-10006-62	S)IC SMD LMC662CM 2X O-AMP
IC240		002-10006-60	S) IC SMD LMC660CM O-AMP 4X
IC250		002-10078-00	S)IC SMD MC78M05CDT 5V REG0.5A
IC330		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC610		002-10078-05	S) IC SMD 78L05 5V REG
IC630		002-10003-17	(S) IC LM317L REG S0-8 100MA
IC640		002-10003-58	S) IC SMD LM358 DUAL O-AMP
IC650		002-10012-32	SMD DS1232LPS-2 LP RESET&W-DOG
IC710		002-74900-04	S) IC SMD 74HC04D 6X INV BUFFD
IC740		002-14519-10	S) IC MC145191F SMD SYNTH
IC750		002-10330-78	S) IC MC33078D 2X AMP LO NOISE
IC810		002-08951-20	S) IC AT89C51 PLCC44 MIC 12MHZ
IC820		002-12416-00	S)IC SMD AT24C16N-10SC EEPROM
L335		056-10330-02	IND SMD 330NH SIMID02
L340		056-10330-02	IND SMD 330NH SIMID02
L345		052-08135-25	COIL A/W 2.5T/3.5MM HOR 0.8MM
L346		052-08125-15	COIL A/W 1.5T/2.5MM HOR 0.8MM
L355		056-14150-02	IND SMD 1.5UH SIMID02
L360		052-08135-35	COIL A/W 3.5T/3.5MM HOR 0.8MM
L365		052-08140-15	COIL A/W 1.5T/4.0MM HOR 0.8MM
L370		065-10009-20	BEAD FER SMD BDS 3/3/8.9-4S2
L375		065-10004-20	BEAD FE SMD CBD 4.6/3/3-4S2
L380		056-14150-02	IND SMD 1.5UH SIMID02
L385		052-08145-35	COIL A/W 3.5/4.5MM HOR 0.8MM
L390		056-10330-02	IND SMD 330NH SIMID02
L750		056-10068-02	IND SMD 68NH SIMID02
L910		052-08145-35	COIL A/W 3.5/4.5MM HOR 0.8MM
L920		052-08145-35	COIL A/W 3.5/4.5MM HOR 0.8MM
PL1		070-01001-00	D-RANGE 15 WAY COMPL T800
Q100		000-10008-47	S) XSTR SMD BCW72 NPN
Q101		000-10008-47	S) XSTR SMD BCW72 NPN
Q102		000-10008-47	S) XSTR SMD BCW72 NPN
Q103		000-10008-47	S) XSTR SMD BCW72 NPN
*Q104	20-1021	000-10008-47	S) XSTR SMD BCW72 NPN
*Q104	26-1021	000-10008-47	S) XSTR SMD BCW72 NPN
Q105		000-10008-47	S) XSTR SMD BCW72 NPN
Q305		000-10008-47	S) XSTR SMD BCW72 NPN
Q310		000-10008-47	S) XSTR SMD BCW72 NPN
Q315		000-00033-12	XSTR BD242 TO-220 PNP ISOLTD
Q320		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q325		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q330		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q335		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q340		000-10008-47	S) XSTR SMD BCW72 NPN
Q345		000-10008-47	S) XSTR SMD BCW72 NPN
Q365		000-10038-66	S) XSTR SMD MRF3866 SO8
Q370		000-00022-30	S) XSTR 2N4427 NPN T039 VHF DR
Q510		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q520		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q530		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q540		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q550		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
Q610		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q620		000-00033-12	XSTR BD242 TO-220 PNP ISOLTD
Q630		000-10003-00	S) XSTR BSR30 PNP AF SOT-89
Q660		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
Q670		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q750		000-10008-07	S) XSTR SMD BC807 PNP SOT23 AF
Q760		000-10008-47	S) XSTR SMD BCW72 NPN
Q770		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q775		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q780		000-10008-47	S) XSTR SMD BCW72 NPN
Q785		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q790		000-10003-12	S) XSTR SMD BFR31 N JFET SOT23
Q795		000-10057-10	S) XSTR SMD BR571 NPN SOT23
Q820		000-10008-17	S) XSTR SMD BC817-25 NPN SOT23
Q830		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q840		000-10008-57	S) XSTR SMD BCW70 PNP SOT23 SS
Q850		000-10008-47	S) XSTR SMD BCW72 NPN
Q860		000-10008-47	S) XSTR SMD BCW72 NPN
R100		036-14220-00	RES M/F 0805 2K2 5%
R101		036-12220-00	RES M/F 0805 22E 5%
R102		036-12220-00	RES M/F 0805 22E 5%
R103		036-14470-10	RES M/F 0805 4K7 1%
R104		036-14470-10	RES M/F 0805 4K7 1%
R105		036-14470-10	RES M/F 0805 4K7 1%
R106		036-14470-10	RES M/F 0805 4K7 1%
R107		036-14470-10	RES M/F 0805 4K7 1%
R108		036-14470-10	RES M/F 0805 4K7 1%
R109		036-15150-00	RES M/F 0805 15K 5%
R110		036-15100-10	RES M/F 0805 10K 1%
R111		036-15100-10	RES M/F 0805 10K 1%
R112		036-15100-10	RES M/F 0805 10K 1%
R113		036-15100-10	RES M/F 0805 10K 1%
R114		036-15470-10	RES M/F 0805 47K 1%
R115		036-15150-00	RES M/F 0805 15K 5%
R116		036-13100-10	RES M/F 0805 100E 1%
R117		036-13470-00	RES M/F 0805 470E 5%
R118		036-15470-10	RES M/F 0805 47K 1%
R119		036-15100-10	RES M/F 0805 10K 1%
R120		036-13470-00	RES M/F 0805 470E 5%
R122		036-15100-10	RES M/F 0805 10K 1%

Ref	Var	IPN	Description
R123		036-13470-00	RES M/F 0805 470E 5%
*R124	20-1021	036-12560-00	RES M/F 0805 56E 5%
*R124	26-1021	036-12560-00	RES M/F 0805 56E 5%
*R125	20-1021	036-14100-10	RES M/F 0805 1K 1%
*R125	26-1021	036-14100-10	RES M/F 0805 1K 1%
R126		036-14560-00	RES M/F 0805 5K6 5%
R127		036-14100-10	RES M/F 0805 1K 1%
*R128	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R128	26-1021	036-14220-00	RES M/F 0805 2K2 5%
R129		036-13560-10	RES M/F 0805 560E 1%
R130		036-15100-10	RES M/F 0805 10K 1%
R131		036-16470-00	RES M/F 0805 470K 5%
R132		036-15100-10	RES M/F 0805 10K 1%
*R133	20-1021	036-12220-00	RES M/F 0805 22E 5%
*R133	26-1021	036-12220-00	RES M/F 0805 22E 5%
%R134	20-1020	036-15220-00	RES M/F 0805 22K 5%
%R134	20-1021	036-15220-00	RES M/F 0805 22K 5%
%R134	26-1020	036-15120-00	RES M/F 0805 12K 5%
%R134	26-1021	036-15120-00	RES M/F 0805 12K 5%
*R135	20-1021	036-14100-10	RES M/F 0805 1K 1%
*R135	26-1021	036-14100-10	RES M/F 0805 1K 1%
R136		036-12100-10	RES M/F 0805 10E 1%
%R137	20-1020	036-14150-10	RES M/F 0805 1K5 1%
%R137	20-1021	036-14150-10	RES M/F 0805 1K5 1%
%R137	26-1020	036-13820-00	RES M/F 0805 820E 5%
%R137	26-1021	036-13820-00	RES M/F 0805 820E 5%
%R138	20-1020	036-15220-00	RES M/F 0805 22K 5%
%R138	20-1021	036-15220-00	RES M/F 0805 22K 5%
%R138	26-1020	036-15120-00	RES M/F 0805 12K 5%
%R138	26-1021	036-15120-00	RES M/F 0805 12K 5%
%R139	20-1020	036-15220-00	RES M/F 0805 22K 5%
%R139	20-1021	036-15220-00	RES M/F 0805 22K 5%
%R139	26-1020	036-10000-00	RES M/F 0805 ZERO OHM
%R139	26-1021	036-10000-00	RES M/F 0805 ZERO OHM
%R140	20-1020	036-14120-00	RES M/F 0805 1K2 5%
%R140	20-1021	036-14120-00	RES M/F 0805 1K2 5%
%R140	26-1020	036-15390-10	RES M/F 0805 39K 1%
%R140	26-1021	036-15390-10	RES M/F 0805 39K 1%
*R141	20-1021	036-17100-10	RES M/F 0805 1M 1%
*R141	26-1021	036-17100-10	RES M/F 0805 1M 1%
*R142	20-1021	036-16100-10	RES M/F 0805 100K 1%
*R142	26-1021	036-16100-10	RES M/F 0805 100K 1%
*R143	20-1021	036-15220-00	RES M/F 0805 22K 5%
*R143	26-1021	036-15220-00	RES M/F 0805 22K 5%
*R144	20-1021	036-14100-10	RES M/F 0805 1K 1%
*R144	26-1021	036-14100-10	RES M/F 0805 1K 1%
*R145	20-1021	036-14470-10	RES M/F 0805 4K7 1%
*R145	26-1021	036-14470-10	RES M/F 0805 4K7 1%
*R146	20-1021	036-15470-10	RES M/F 0805 47K 1%
*R146	26-1021	036-15470-10	RES M/F 0805 47K 1%
*R147	20-1021	036-16100-10	RES M/F 0805 100K 1%
*R147	26-1021	036-16100-10	RES M/F 0805 100K 1%
%R148	20-1020	036-13560-10	RES M/F 0805 560E 1%
%R148	20-1021	036-13560-10	RES M/F 0805 560E 1%
%R148	26-1020	036-14270-10	RES M/F 0805 2K7 1%
%R148	26-1021	036-14270-10	RES M/F 0805 2K7 1%
R149		036-16100-10	RES M/F 0805 100K 1%
*%R150	20-1021	036-10000-00	RES M/F 0805 ZERO OHM
%R150	26-1020	036-15220-00	RES M/F 0805 22K 5%
*%R150	26-1021	036-15220-00	RES M/F 0805 22K 5%
*R151	20-1021	036-16560-00	RES M/F 0805 560K 5%
*R151	26-1021	036-16560-00	RES M/F 0805 560K 5%
*R152	20-1021	036-16100-10	RES M/F 0805 100K 1%
*R152	26-1021	036-16100-10	RES M/F 0805 100K 1%
R153		036-10000-00	RES M/F 0805 ZERO OHM
*R154	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R154	26-1021	036-14220-00	RES M/F 0805 2K2 5%
R155		036-14270-10	RES M/F 0805 2K7 1%
R156		036-14220-00	RES M/F 0805 2K2 5%
*R158	20-1021	036-15100-10	RES M/F 0805 10K 1%
*R158	26-1021	036-15100-10	RES M/F 0805 10K 1%
*R159	20-1021	036-15220-00	RES M/F 0805 22K 5%
*R159	26-1021	036-15220-00	RES M/F 0805 22K 5%
*R160	20-1021	036-14270-10	RES M/F 0805 2K7 1%
*R160	26-1021	036-14270-10	RES M/F 0805 2K7 1%
*R161	20-1021	036-15100-10	RES M/F 0805 10K 1%
*R161	26-1021	036-15100-10	RES M/F 0805 10K 1%
R162		036-15100-10	RES M/F 0805 10K 1%
R163		036-14100-10	RES M/F 0805 1K 1%
R164		036-14100-10	RES M/F 0805 1K 1%
R165		036-15120-00	RES M/F 0805 12K 5%
*R166	20-1021	036-16100-10	RES M/F 0805 100K 1%
*R166	26-1021	036-16100-10	RES M/F 0805 100K 1%
*R167	20-1021	036-16100-10	RES M/F 0805 100K 1%
*R167	26-1021	036-16100-10	RES M/F 0805 100K 1%
R168		036-15180-10	RES M/F 0805 18K 1%
R169		036-15180-10	RES M/F 0805 18K 1%
R170		036-10000-00	RES M/F 0805 ZERO OHM
R171		036-10000-00	RES M/F 0805 ZERO OHM
R172		036-15330-10	RES M/F 0805 33K 1%
*R174	20-1021	036-16100-10	RES M/F 0805 100K 1%
*R174	26-1021	036-16100-10	RES M/F 0805 100K 1%
*R175	20-1021	036-16100-10	RES M/F 0805 100K 1%
*R175	26-1021	036-16100-10	RES M/F 0805 100K 1%
R176		036-15390-10	RES M/F 0805 39K 1%
R177		036-15100-10	RES M/F 0805 10K 1%
R178		036-16330-00	RES M/F 0805 330K 5%
*R179	20-1021	036-12220-00	RES M/F 0805 22E 5%
*R179	26-1021	036-12220-00	RES M/F 0805 22E 5%
R180		036-15100-10	RES M/F 0805 10K 1%
R181		036-15100-10	RES M/F 0805 10K 1%
R182		036-15100-10	RES M/F 0805 10K 1%
R183		036-14270-10	RES M/F 0805 2K7 1%
R184		036-14470-10	RES M/F 0805 4K7 1%
R185		036-15470-10	RES M/F 0805 47K 1%
R186		036-13100-10	RES M/F 0805 100E 1%
R187		036-15390-10	RES M/F 0805 39K 1%
R188		036-13100-10	RES M/F 0805 100E 1%
*R189	20-1021	036-12220-00	RES M/F 0805 22E 5%
*R189	26-1021	036-12220-00	RES M/F 0805 22E 5%
R190		036-17100-10	RES M/F 0805 1M 1%
R191		036-14470-10	RES M/F 0805 4K7 1%
R192		036-13100-10	RES M/F 0805 100E 1%
R193		036-12220-00	RES M/F 0805 22E 5%
R194		036-14270-10	RES M/F 0805 2K7 1%
R195		036-12220-00	RES M/F 0805 22E 5%
R196		036-17100-10	RES M/F 0805 1M 1%
R197		036-12220-00	RES M/F 0805 22E 5%
R198		036-12220-00	RES M/F 0805 22E 5%
R199		036-17100-10	RES M/F 0805 1M 1%
R200		036-17100-10	RES M/F 0805 1M 1%
R201		036-15390-10	RES M/F 0805 39K 1%
R202		036-12220-00	RES M/F 0805 22E 5%
R203		036-16820-10	RES M/F 0805 820K 1%
R204		036-12220-00	RES M/F 0805 22E 5%
R205		036-15820-00	RES M/F 0805 82K 5%
R206		036-15220-00	RES M/F 0805 22K 5%
R207		036-15330-10	RES M/F 0805 33K 1%
*R208	20-1021	036-12220-00	RES M/F 0805 22E 5%
*R208	26-1021	036-12220-00	RES M/F 0805 22E 5%
R209		036-12220-00	RES M/F 0805 22E 5%
R210		036-15390-10	RES M/F 0805 39K 1%
R211		036-14680-10	RES M/F 0805 6K8 1%
R212		036-12220-00	RES M/F 0805 22E 5%
R213		036-15390-10	RES M/F 0805 39K 1%
R214		036-12220-00	RES M/F 0805 22E 5%
R215		036-15100-10	RES M/F 0805 10K 1%
R216		036-15470-10	RES M/F 0805 47K 1%
R217		036-12220-00	RES M/F 0805 22E 5%
*R218	20-1021	036-12220-00	RES M/F 0805 22E 5%
*R218	26-1021	036-12220-00	RES M/F 0805 22E 5%
R219		036-14180-00	RES M/F 0805 1K8 5%
R220		036-15470-10	RES M/F 0805 47K 1%
R221		036-14180-00	RES M/F 0805 1K8 5%
R222		036-12100-10	RES M/F 0805 10E 1%
R223		036-12220-00	RES M/F 0805 22E 5%
*R224	20-1021	036-12220-00	RES M/F 0805 22E 5%
*R224	26-1020	036-12220-00	RES M/F 0805 22E 5%
*R224	26-1021	036-12220-00	RES M/F 0805 22E 5%
R225		036-15470-10	RES M/F 0805 47K 1%
R226		036-15470-10	RES M/F 0805 47K 1%
*%R240	20-1021	036-10000-00	RES M/F 0805 ZERO OHM
*%R240	26-1021	036-10000-00	RES M/F 0805 ZERO OHM
*%R243	20-1021	036-10000-00	RES M/F 0805 ZERO OHM
*%R243	26-1021	036-10000-00	RES M/F 0805 ZERO OHM
*%R244	20-1021	036-10000-00	RES M/F 0805 ZERO OHM
*%R244	26-1021	036-10000-00	RES M/F 0805 ZERO OHM
*%R246	20-1021	036-10000-00	RES M/F 0805 ZERO OHM
*%R246	26-1021	036-10000-00	RES M/F 0805 ZERO OHM
*%R247	20-1021	036-10000-00	RES M/F 0805 ZERO OHM
*%R247	26-1021	036-10000-00	RES M/F 0805 ZERO OHM
R302		036-15220-00	RES M/F 0805 22K 5%
R304		036-14270-10	RES M/F 0805 2K7 1%
R306		036-15100-10	RES M/F 0805 10K 1%
R308		036-16100-10	RES M/F 0805 100K 1%
R310		036-15220-00	RES M/F 0805 22K 5%
R312		036-14150-10	RES M/F 0805 1K5 1%
R314		036-13100-10	RES M/F 0805 100E 1%
R316		036-15100-10	RES M/F 0805 10K 1%
R318		036-14220-00	RES M/F 0805 2K2 5%
R320		036-14100-10	RES M/F 0805 1K 1%
R322		036-12220-00	RES M/F 0805 22E 5%
R324		036-13470-00	RES M/F 0805 470E 5%
R326		036-13470-00	RES M/F 0805 470E 5%
R328		036-13470-00	RES M/F 0805 470E 5%
R330		036-12220-00	RES M/F 0805 22E 5%
R332		036-15470-10	RES M/F 0805 47K 1%
R334		036-15100-10	RES M/F 0805 10K 1%
R336		036-14100-10	RES M/F 0805 1K 1%
R340		036-16100-10	RES M/F 0805 100K 1%
R342		036-12390-00	RES M/F 0805 39E 5%
R344		036-13150-10	RES M/F 0805 150E 1%
R345		036-12220-00	RES M/F 0805 22E 5%
R346		036-14150-10	RES M/F 0805 1K5 1%
R348		036-12470-00	RES M/F 0805 47E 5%
R350		036-13560-10	RES M/F 0805 560E 1%
R352		036-13330-00	RES M/F 0805 330E 5%
R354		036-14100-10	RES M/F 0805 1K 1%
R358		036-12470-00	RES M/F 0805 47E 5%
R359		036-13150-10	RES M/F 0805 150E 1%
R360		036-12120-00	RES M/F 0805 12E 5%
R362		036-11470-00	RES M/F 0805 4E7 10%
R364		036-14150-10	RES M/F 0805 1K5 1%
R366		036-14150-10	RES M/F 0805 1K5 1%
R368		036-14150-10	RES M/F 0805 1K5 1%
R372		036-14150-10	RES M/F 0805 1K5 1%

Ref	Var	IPN	Description
R375		036-11330-00	RES M/F 0805 3E3 5%
R377		036-14100-10	RES M/F 0805 1K 1%
R378		036-14100-10	RES M/F 0805 1K 1%
R379		036-14120-00	RES M/F 0805 1K2 5%
R380		036-13180-00	RES M/F 0805 180E 5%
R381		036-13180-00	RES M/F 0805 180E 5%
R382		036-15470-10	RES M/F 0805 47K 1%
R384		036-15150-00	RES M/F 0805 15K 5%
R385		036-16120-10	RES M/F 0805 120K 1%
R386		036-14100-10	RES M/F 0805 1K 1%
R387		036-14180-00	RES M/F 0805 1K8 5%
R388		036-15150-00	RES M/F 0805 15K 5%
R389		036-14180-00	RES M/F 0805 1K8 5%
R390		036-15150-00	RES M/F 0805 15K 5%
R391		036-14180-00	RES M/F 0805 1K8 5%
R394		036-14470-10	RES M/F 0805 4K7 1%
R396		036-14100-10	RES M/F 0805 1K 1%
R502		036-13330-00	RES M/F 0805 330E 5%
R505		036-15150-00	RES M/F 0805 15K 5%
R510		036-13680-00	RES M/F 0805 680E 5%
R515		036-12560-00	RES M/F 0805 56E 5%
R520		036-16120-10	RES M/F 0805 120K 1%
R525		036-15470-10	RES M/F 0805 47K 1%
R530		036-15220-00	RES M/F 0805 22K 5%
R535		036-15100-10	RES M/F 0805 10K 1%
R540		036-14220-00	RES M/F 0805 2K2 5%
R545		036-14470-10	RES M/F 0805 4K7 1%
%R550	20-1020	036-14470-10	RES M/F 0805 4K7 1%
%R550	20-1021	036-14470-10	RES M/F 0805 4K7 1%
%R550	26-1020	036-14470-10	RES M/F 0805 4K7 1%
%R550	26-1021	036-14470-10	RES M/F 0805 4K7 1%
R555		036-14470-10	RES M/F 0805 4K7 1%
R560		036-14120-00	RES M/F 0805 1K2 5%
R609		036-14100-10	RES M/F 0805 1K 1%
R613		036-13560-10	RES M/F 0805 560E 1%
R615		036-13100-10	RES M/F 0805 100E 1%
R617		036-10000-00	RES M/F 0805 ZERO OHM
R619		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP
R621		036-01100-10	RES 1 OHM 1 WATT 2512 CHIP
R625		036-14100-10	RES M/F 0805 1K 1%
R629		036-03270-10	RES 270 OHM 1 WATT 2512 CHIP
R633		036-14680-10	RES M/F 0805 6K8 1%
R637		036-12220-00	RES M/F 0805 22E 5%
R638		036-12220-00	RES M/F 0805 22E 5%
R640		036-12100-10	RES M/F 0805 10E 1%
R641		036-14150-10	RES M/F 0805 1K5 1%
R645		036-13470-00	RES M/F 0805 470E 5%
R649		036-14470-10	RES M/F 0805 4K7 1%
R653		036-15100-10	RES M/F 0805 10K 1%
R655		036-10000-00	RES M/F 0805 ZERO OHM
R656		036-10000-00	RES M/F 0805 ZERO OHM
R681		036-13100-10	RES M/F 0805 100E 1%
R685		036-15150-00	RES M/F 0805 15K 5%
R689		036-12100-10	RES M/F 0805 10E 1%
R693		036-16100-10	RES M/F 0805 100K 1%
R696		036-15560-10	RES MF 0805 56K 1%
R709		036-12100-10	RES M/F 0805 10E 1%
R710		036-13100-10	RES M/F 0805 100E 1%
R711		036-13100-10	RES M/F 0805 100E 1%
R734		036-13470-00	RES M/F 0805 470E 5%
R735		036-13470-00	RES M/F 0805 470E 5%
R736		036-13470-00	RES M/F 0805 470E 5%
R742		036-13150-10	RES M/F 0805 150E 1%
R743		036-13150-10	RES M/F 0805 150E 1%
R744		036-12220-00	RES M/F 0805 22E 5%
R746		036-12220-00	RES M/F 0805 22E 5%
R747		036-12220-00	RES M/F 0805 22E 5%
R748		036-15470-10	RES M/F 0805 47K 1%
R749		036-15470-10	RES M/F 0805 47K 1%
R750		036-12220-00	RES M/F 0805 22E 5%
R752		036-12680-00	RES M/F 0805 68E 5%
R753		036-17220-00	RES M/F 0805 2M2 5%
R754		036-14100-10	RES M/F 0805 1K 1%
R756		036-15120-00	RES M/F 0805 12K 5%
R757		036-15120-00	RES M/F 0805 12K 5%
R758		036-14120-00	RES M/F 0805 1K2 5%
R759		036-13330-00	RES M/F 0805 330E 5%
R760		036-13180-00	RES M/F 0805 180E 5%
R762		036-13100-10	RES M/F 0805 100E 1%
R763		036-13100-10	RES M/F 0805 100E 1%
R765		036-13680-00	RES M/F 0805 680E 5%
R766		036-14100-10	RES M/F 0805 1K 1%
R767		036-13680-00	RES M/F 0805 680E 5%
R769		036-13180-00	RES M/F 0805 180E 5%
R771		036-14820-10	RES M/F 0805 8K2 1%
R772		036-15220-00	RES M/F 0805 22K 5%
R774		036-14820-10	RES M/F 0805 8K2 1%
R775		036-14680-10	RES M/F 0805 6K8 1%
R784		036-12680-00	RES M/F 0805 68E 5%
R785		036-14330-10	RES M/F 0805 3K3 1%
R786		036-12100-10	RES M/F 0805 10E 1%
R787		036-12100-10	RES M/F 0805 10E 1%
R790		036-13220-10	RES 0805 220E 1%
R791		036-13100-10	RES M/F 0805 100E 1%
R792		036-14100-10	RES M/F 0805 1K 1%
R808		036-12100-10	RES M/F 0805 10E 1%
R809		036-14470-10	RES M/F 0805 4K7 1%
R810		036-14470-10	RES M/F 0805 4K7 1%

Ref	Var	IPN	Description
R811		036-14470-10	RES M/F 0805 4K7 1%
R812		036-14470-10	RES M/F 0805 4K7 1%
R813		036-14470-10	RES M/F 0805 4K7 1%
R815		036-15470-10	RES M/F 0805 47K 1%
R816		036-16150-00	RES M/F 0805 150K 5%
R818		036-14470-10	RES M/F 0805 4K7 1%
R819		036-14470-10	RES M/F 0805 4K7 1%
R821		036-15470-10	RES M/F 0805 47K 1%
R822		036-15470-10	RES M/F 0805 47K 1%
*R824	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R824	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R825	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R825	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R826	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R826	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R827	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R827	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R828	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R828	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R829	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R829	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R830	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R830	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R831	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R831	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R832	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R832	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R833	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R833	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R835	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R835	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R836	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R836	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R837	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R837	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R840	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R840	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R841	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R841	26-1021	036-14220-00	RES M/F 0805 2K2 5%
*R842	20-1021	036-14220-00	RES M/F 0805 2K2 5%
*R842	26-1021	036-14220-00	RES M/F 0805 2K2 5%
R845		036-13470-00	RES M/F 0805 470E 5%
R846		036-13470-00	RES M/F 0805 470E 5%
R847		036-13470-00	RES M/F 0805 470E 5%
R848		036-14470-10	RES M/F 0805 4K7 1%
R849		036-13470-00	RES M/F 0805 470E 5%
R853		036-14470-10	RES M/F 0805 4K7 1%
R854		036-14470-10	RES M/F 0805 4K7 1%
RV100		042-05100-05	RES PRESET SMD 10K CER 4MM SQ
RV101		042-05500-05	RES PRESET SMD 50K CER 4MM SQ
RV102		042-05100-05	RES PRESET SMD 10K CER 4MM SQ
SK200		240-10000-07	CONN SMD SKT 16W 2R M-MATCH
*SK220	20-1021	240-02100-44	SKT COAX MINI JACK PCB MT ANG.
*SK220	26-1021	240-02100-44	SKT COAX MINI JACK PCB MT ANG.
*SK805	20-1021	240-10000-07	CONN SMD SKT 16W 2R M-MATCH
*SK805	26-1021	240-10000-07	CONN SMD SKT 16W 2R M-MATCH
SK810		240-04020-42	SKT 44 PIN SMD PLCC
T610		050-15119-52	COIL SMD 680uH XFMR 5119-T052
%X100	20-1020	539-00010-55	TCXO 12.8M 1PPM-20+70/2PPM -30
%X100	20-1021	539-00010-45	VCTCXO 12.8MHZ +-1.5PPM-30+70C
%X100	26-1020	539-00010-55	TCXO 12.8M 1PPM-20+70/2PPM -30
%X100	26-1021	539-00010-45	VCTCXO 12.8MHZ +-1.5PPM-30+70C
X101		539-00010-46	VCTCXO 12.8MHZ 3.0PPM -30 +75C

T837 Mechanical & Miscellaneous Parts (IPN 220-01585-01)

IPN	Description	IPN	Description
220-01585-01	POCSAG PAGING EXCITER PCB		
240-02100-06	SKT COAX N TYPE PNL MTG OP-TER		
240-04021-77	SKT JACK 1.3 PCB MT 64W		
303-11169-04	CHASSIS PAINTED T800 SER II		
303-23118-00	COVER A3M2247 D RANGE T855/7		
303-50074-00	CLIP SPRING XSTR CLAMP T857		
308-01007-01	HANDLE BS SII 2 WASHERS INC		
312-01052-02	LID TOP T800 SER II PTND		
312-01053-02	LID BOTTOM T800 SER II PNTD		
316-06727-00	PNL FRT T800 SII PAGING		
349-00020-36	SCREW TT M3X8m PANTORX BLK		
349-00020-36	SCREW TT M3X8m PANTORX BLK		
349-00020-43	SCRW T/T M4X12MM P/POZ BZ		
349-00020-45	SCRW T/T M4X20MM P/POZ BZ		
349-00020-55	SCRW M3*8 P/P T/T BLCKZNC CHRM		
352-00010-08	NUT M3 COLD FORM HEX ST BZ		
352-00010-29	NUT M4 NYLOC HEX		
353-00010-13	WSHR M3 S/PROOF INT BZ		
353-00010-24	WSHR M4x8mm Flat ST BZ		
362-00010-33	GROMMET LED MTG 3MM		
362-01101-00	GASKET INSUL SIL PAD 2000 TO5		

T837 Grid Reference Index (IPN 220-01585-01)

How To Use This Grid Reference Index

The first digit in the PCB layout reference is a "1" or "2", indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C100	1:C4	2-A9	C166	1:D4	2-Q4	C623	1:N6	6-N8	C813	1:N3	8-J4
C101	1:B5	2-A7	C167	1:D4	2-R4	C625	1:M6	6-Q8	C910	1:P7	9-E5
C102	1:D3	2-A4	C168	1:C8	2-R4	C626	1:M6	6-R8	C920	1:P7	9-F5
C103	1:D2	2-A2	*C169	1:C3	2-R3	C628	1:M6	6-R8	C930	1:P6	9-G5
C104	1:D7	2-A0	C170	1:D8	2-R2	C630	1:N5	6-K5			
C105	1:B5	2-B8	*C171	1:D8	2-R0	C631	1:N5	6-M6	%D1	1:P5	1-Q1
C106	1:A5	2-B7	C172	1:D8	2-R2	C634	1:N5	6-M4	%D2	1:P5	1-R1
*C107	1:C4	2-B9	*C173	1:D8	2-R0	C636	1:M5	6-M4	*D100	1:B4	2-B9
C108	1:B5	2-B8	C301	1:E8	3-A8	C638	1:M6	6-P5	*D100	1:B4	2-B9
C109	1:B5	2-C6	C304	1:F8	3-D9	C640	1:M5	6-R6	D105	1:A4	2-B7
*C110	1:C2	2-D1	C307	1:F8	3-C8	C660	1:L5	6-K0	D105	1:A4	2-B7
*C111	1:C3	2-D1	C309	1:F4	3-Q8	C665	1:L5	6-K0	*D116	1:C1	2-H3
C112	1:C6	2-D8	C310	1:F8	3-D8	C670	1:L5	6-L0	D119	1:A7	2-Q8
%C113	1:C8	2-E4	C313	1:F7	3-G8	C673	1:L5	6-P2	D120	1:A6	2-J8
C115	1:A5	2-C7	C317	1:F7	3-E8	C677	1:L6	6-P0	D120	1:A6	2-J8
*C122	1:C2	2-E1	C318	1:F7	3-F9	C681	1:L6	6-R2	D125	1:A8	2-R6
C123	1:C6	2-E0	C319	1:F8	3-H9	C684	1:L6	6-R2	D130	1:D3	2-B4
*C124	1:C3	2-F0	C325	1:E5	3-K3	C687	1:M6	6-Q1	D130	1:D3	2-B4
%C125	1:C9	2-F5	C328	1:E5	3-L4	C690	1:L6	6-R0	D135	1:D2	2-B2
*C126	1:C3	2-F0	C330A	1:F7	3-N8	C693	1:L6	6-R0	D135	1:D2	2-B2
*C127	1:C2	2-F3	C330B	1:F7	3-N8	C706	1:J2	7-B5	D140	1:C6	2-A0
%C128	1:C9	2-F5	C331	1:E6	3-L4	C708	1:J2	7-C9	D140	1:C6	2-A0
%C129	1:C9	2-G5	C334	1:E6	3-P4	C709	1:K4	7-D9	D160	1:D7	2-B0
*C130	1:B2	2-G3	C337	1:E6	3-Q4	C710	1:J3	7-D8	D160	1:D7	2-B0
*C131	1:B3	2-G0	C340	1:F5	3-C2	C712	1:H2	7-E7	*D200	1:B2	2-G2
*C132	1:B3	2-G1	C343	1:F5	3-E3	C713	1:H2	7-E6	*D200	1:B2	2-G2
*C133	1:B2	2-G2	C346	1:F4	3-D0	C714	1:J3	7-E8	*D220	1:C3	2-F0
*C134	1:B3	2-H2	C349	1:F5	3-F1	C733	1:H2	7-E3	*D220	1:C3	2-F0
*C135	1:B3	2-H1	C352	1:F5	3-G2	C735	1:J2	7-A1	D340	1:F5	3-D2
*%C136	1:D9	2-H5	C355	1:F5	3-G2	C736	1:J2	7-B1	D350	1:F5	3-E2
%C137	1:D8	2-H5	C358	1:F5	3-H2	C740A	1:H2	7-B4	D360	1:F5	3-E2
C138	1:B6	2-H8	C361	1:E5	3-K3	C740B	1:H2	7-B3	D370	1:F7	3-M8
C139	1:B6	2-H7	%C370	1:E6	3-L2	C741A	1:H2	7-C4	D610	1:N6	6-K6
*C140	1:C4	2-J0	C376	1:E7	3-P3	C741B	1:G2	7-C3	D610	1:N6	6-L6
C141	1:B6	2-J7	C379	1:E7	3-Q3	C742A	1:H2	7-D4	D640	1:L5	6-M1
C142	1:B7	2-J9	C382	1:F5	3-F1	C742B	1:H3	7-D3	D640	1:L5	6-M1
*C143	1:B4	2-K2	C383	1:E6	3-L3	C743	1:H2	7-B1	D645	1:M5	6-R6
C144	1:B7	2-K7	C384	1:E6	3-L2	C745	1:G3	7-D1	D730	1:H3	7-H1
*C145	1:B4	2-K2	C385	1:F6	3-B5	C750	1:H4	7-F8	D740	1:H3	7-J2
*C146	1:B3	2-K3	C388	1:E8	3-D6	C757	1:G4	7-F5			
*C147	1:B2	2-L3	C390	1:F7	3-D4	C759	1:G4	7-G4	IC100	1:C6	2-L0
C148	1:D7	2-L1	C391	1:E7	3-P3	C761	1:G3	7-J4	IC100	1:C6	2-L3
C149	1:B6	2-M3	C392	1:E7	3-F5	C762	1:G3	7-J4	IC100	1:C6	2-D0
C150	1:C7	2-M2	C393	1:E8	3-G6	C764	1:H3	7-H2	IC100	1:C6	2-D8
C151	1:A6	2-M3	C394	1:E7	3-F5	C765	1:G3	7-J2	IC100	1:C6	2-D8
C152	1:B8	2-N7	C395	1:F6	3-J6	C767	1:H3	7-K3	IC100	1:C6	2-C8
C153	1:B8	2-N8	C397	1:F6	3-J5	C769	1:H4	7-M4	IC100	1:C6	2-C8
C154	1:B7	2-N2	C398	1:E7	3-R4	C770	1:J4	7-N4	IC102	1:B6	2-C6
C155	1:B8	2-N8	C503	1:K6	5-M8	C772	1:G4	7-M2	IC102	1:B6	2-L1
C156	1:B6	2-N3	C505	1:K6	5-M6	C774	1:H4	7-P2	IC102	1:B6	2-M3
*C157	1:C4	2-P2	C510	1:J5	5-E3	C776	1:H4	7-N1	IC102	1:B6	2-C7
C158	1:A6	2-P3	C513	1:H5	5-G4	C782	1:G2	7-N1	IC102	1:B6	2-D6
C159	1:C5	2-P4	C535	1:K5	5-M4	C784	1:G2	7-R1	IC102	1:B6	2-L1
C160	1:D4	2-P4	C550	1:K4	5-L2	C786	1:G2	7-R1	IC102	1:B6	2-M1
C161	1:B6	2-Q2	C605	1:L6	6-D8	C788	1:G3	7-P0	IC105	1:C6	2-E8
C162	1:C6	2-Q3	C610A	1:M5	6-F8	C790	1:G3	7-Q0	IC105	1:C6	2-F8
C163	1:B4	2-Q6	C610B	1:M5	6-G8	C792	1:G3	7-R1	IC105	1:C6	2-N3
C164	1:C8	2-Q2	C611A	1:M6	6-H8	C810	1:L3	8-K8	IC110	1:B6	2-E6
*C165	1:C3	2-Q3	C611B	1:M5	6-J8	C812	1:L2	8-F5	IC110	1:B6	2-F6

Device	PCB	Circuit
IC110	1:B6	2-P3
IC115	1:C6	2-C4
IC115	1:C6	2-D0
IC115	1:C6	2-H9
IC115	1:C6	2-H7
IC115	1:C6	2-P3
IC120	1:B7	2-K9
IC120	1:B7	2-K6
IC120	1:B7	2-K8
IC120	1:B7	2-K7
IC120	1:B7	2-P2
IC125	1:C8	2-N6
IC125	1:C8	2-Q2
IC125	1:C8	2-M5
IC125	1:C8	2-N5
IC125	1:C8	2-P7
IC140	1:C7	2-N1
IC140	1:C7	2-L1
IC140	1:C7	2-L8
IC140	1:C7	2-D4
IC140	1:C7	2-P1
IC150	1:B7	2-J5
IC150	1:B7	2-L6
IC150	1:B7	2-M1
IC150	1:B7	2-L8
*IC160	1:C3	2-N1
*IC160	1:C3	2-J1
*IC160	1:C3	2-Q1
*IC160	1:C3	2-Q1
*IC200	1:B2	2-E1
*IC210	1:B3	2-G3
*IC210	1:B3	2-G1
*IC210	1:B3	2-K3
*IC220	1:C3	2-H0
*IC220	1:C3	2-Q3
*IC220	1:C3	2-D0
*IC220	1:C3	2-E0
*IC220	1:C3	2-G0
*IC220	1:C3	2-G0
*IC220	1:C3	2-E0
*IC230	1:D9	2-H5
*IC230	1:D9	2-G0
*IC230	1:D9	2-R0
IC240	1:C8	2-J0
IC240	1:C8	2-L0
IC240	1:C8	2-E5
IC240	1:C8	2-R2
IC240	1:C8	2-G4
IC250	1:D4	2-Q5
IC330	1:F8	3-E9
IC330	1:F8	3-M8
IC330	1:F8	3-M0
IC610	1:L5	6-G8
IC630	1:N5	6-K5
IC640	1:M5	6-N5
IC640	1:M5	6-R6
IC640	1:M5	6-N3
IC650	1:L5	6-D4
IC710	1:J2	7-D6
IC710	1:J2	7-D8
IC710	1:J2	7-D7
IC710	1:J2	7-D6
IC710	1:J2	7-C6
IC710	1:J2	7-G0
IC710	1:J2	7-G0
IC740	1:H2	7-D1
IC750	1:H4	7-M3
IC750	1:H4	7-H5
IC750	1:H4	7-F8
IC820	1:L4	8-N2
L335	1:F5	3-E3
L340	1:F5	3-F2
L345	1:F5	3-H2
L346	1:E5	3-H2
L355	1:E5	3-K3
L360	1:E6	3-K3
L365	1:E6	3-M3
L370	1:F6	3-N2
L375	1:E6	3-M4
L380	1:E6	3-N4
L385	1:E7	3-P3
L390	1:E7	3-R4
L750	1:G4	7-R0
L910	1:P7	9-F6
L920	1:P7	9-G6
MICROSTR	2:L8	1 -G8
P100	1:P6	1-R8
P101	1:D3	2-A4
P103	1:D2	2-A2
P105	1:D8	2-J0
%P106	1:C1	2-J2
P810	1:L3	8-A5
*P820	1:L4	8-M8
*P825	1:L4	8-M8
*P830	1:L4	8-M8
*P835	1:L4	8-M7
*P840	1:L4	8-M7
PL100	1:P3	1-F0
Q100	1:D3	2-C4
Q101	1:D2	2-C2
Q102	1:C7	2-C0
Q103	1:C6	2-F0
*Q104	1:C3	2-J0
Q105	1:A7	2-Q8
Q305	1:E8	3-B8
Q310	1:F8	3-G8
Q315	1:F8	3-J8
Q320	1:F6	3-A5
Q325	1:F7	3-C5
Q330	1:F7	3-D4
Q335	1:E7	3-E6
Q340	1:E7	3-G6
Q345	1:F6	3-H6
Q365	1:E5	3-J2
Q370	2:E6	3-N3
Q510	1:J5	5-F3
Q520	1:J5	5-H4
Q530	1:J5	5-H3
Q540	1:K5	5-L4
Q550	1:K5	5-L3
Q610	1:L6	6-E8
Q620	1:N6	6-P8
Q630	1:M6	6-P5
Q660	1:L5	6-N1
Q670	1:M6	6-Q1
Q750	1:G4	7-F3
Q760	1:H3	7-H3
Q770	1:H3	7-H1
Q775	1:H3	7-K3
Q780	1:H3	7-K3
Q785	1:H3	7-K2
Q790	1:H3	7-L3
Q795	1:G3	7-P1
Q820	1:L2	8-D5
Q830	1:L2	8-D5
Q840	1:L2	8-F5
Q850	1:M2	8-G5
Q860	1:L4	8-B3
R100	1:C6	2-A0
R101	1:C4	2-A9
R102	1:B4	2-A8
R103	1:D7	2-A0
R104	1:D3	2-A4
R105	1:D2	2-A2
R106	1:D3	2-B4
R107	1:D7	2-B0
R108	1:D2	2-B2
R109	1:B5	2-B8
R110	1:D3	2-C4
R111	1:D2	2-C2
R112	1:C7	2-C0
R113	1:C7	2-C4
R114	1:C5	2-C8
R115	1:A5	2-C7
R116	1:B5	2-C6
R117	1:C7	2-C0
R118	1:B5	2-C7
R119	1:C7	2-C0
R120	1:C7	2-C5
R122	1:C7	2-D0
R123	1:C7	2-D5
*R124	1:C2	2-D1
*R125	1:C3	2-D1
R126	1:C7	2-D4
R127	1:C6	2-D9
*R128	1:C3	2-D0
R129	1:C8	2-D4
R130	1:C6	2-E0
R131	1:C8	2-E5
R132	1:C6	2-E0
*R133	1:C2	2-E3
%R134	1:C8	2-E4
*R135	1:C3	2-E0
R136	1:C6	2-F0
%R137	1:C8	2-F5
%R138	1:C8	2-F4
%R139	1:C9	2-F5
%R140	1:C8	2-F5
*R141	1:B3	2-F0
*R142	1:C3	2-G0
*R143	1:B2	2-G2
*R144	1:B3	2-G1
*R145	1:B2	2-G2
*R146	1:C3	2-G2
*R147	1:B2	2-G3
%R148	1:C9	2-G5
R149	1:D8	2-H6
*%R150	1:D9	2-H5
*R151	1:B3	2-H2
*R152	1:C3	2-H2
R153	1:C8	2-H0
*R154	1:C2	2-H3
R155	1:C6	2-H9
R156	1:B6	2-H7
%R157	1:C8	2-H0
*R158	1:C3	2-H2
*R159	1:B3	2-J1
*R160	1:C3	2-H0
*R161	1:C3	2-H2
R162	1:C9	2-H0
R163	1:B6	2-J7
R164	1:B7	2-J9
R165	1:B7	2-J8
*R166	1:C4	2-J0
*R167	1:B4	2-J2
R168	1:D7	2-J6
R169	1:D7	2-J5
R170	1:D7	2-J4
R171	1:D7	2-J4
R172	1:B7	2-J8
%R173	1:C3	2-J2
*R174	1:C3	2-J0
*R175	1:B4	2-J2
R176	1:B7	2-K8
R177	1:B7	2-K8
R178	1:B7	2-K7
*R179	1:B4	2-K2
R180	1:B7	2-K6
R181	1:B7	2-K6
R182	1:B7	2-K8
R183	1:C7	2-K8
R184	1:C8	2-K0
R185	1:D8	2-K0
R186	1:B7	2-K5
R187	1:C8	2-K5
R188	1:B7	2-K7
*R189	1:B2	2-K3
R190	1:C7	2-L7
R191	1:C8	2-L0
R192	1:B7	2-L8
R193	1:B6	2-L3
R194	1:D8	2-L0
R195	1:D7	2-L2
R196	1:B8	2-M7
R197	1:C8	2-M2
R198	1:A6	2-M3
R199	1:B8	2-M8
R200	1:B8	2-M8
R201	1:C8	2-M5
R202	1:B7	2-N2
R203	1:B8	2-N6
R204	1:B6	2-N3
R205	1:B8	2-N8
R206	1:C8	2-N5
R207	1:B8	2-N6
*R208	1:C4	2-N2
R209	1:A6	2-P3
R210	1:B8	2-P7
R211	1:B8	2-P5
R212	1:B6	2-P2
R213	1:B8	2-P7
R214	1:C6	2-P3
R215	1:B4	2-Q7
R216	1:A6	2-Q7
R217	1:C8	2-Q2
*R218	1:C4	2-Q3
R219	1:B7	2-Q8
R220	1:A7	2-R7
R221	1:B8	2-R7
R222	1:D4	2-R5
R223	1:D8	2-R2
*R224	1:D8	2-R0
R225	1:D4	2-R5
R226	1:C8	2-R4
*%R240	1:B2	2-E2
*%R241	1:B2	2-E2
*%R242	1:B2	2-E2
*%R243	1:A2	2-E2
*%R244	1:A2	2-E2
*%R245	1:B2	2-E2
*%R246	1:B2	2-E2
*%R247	1:B2	2-E1
R302	1:E8	3-A7
R304	1:E8	3-B7
R306	1:F8	3-C8
R308	1:F8	3-C9
R310	1:F8	3-C9
R312	1:F7	3-D8
R314	1:F7	3-D7
R316	1:F8	3-E8
R318	1:F7	3-E9
R320	1:F8	3-G9
R322	1:F8	3-H8
R324	1:E8	3-J8
R326	1:E7	3-J7
R328	1:F8	3-K8
R330	1:F7	3-M8
R332	1:F7	3-C5
R334	1:E7	3-D6
R336	1:F7	3-D5
R340	1:F6	3-D5
R342	1:F5	3-C2
R344	1:F4	3-C2
R345	1:F7	3-F7
R346	1:F5	3-D2
R348	1:F5	3-D1
R350	1:F5	3-E1
R352	1:E5	3-J2

Device	PCB	Circuit
R354	1:E5	3-J2
R358	1:E6	3-M2
R359	1:F4	3-B2
R360	1:E7	3-Q3
R362	1:E7	3-Q3
R364	1:E7	3-P2
R366	1:E7	3-Q2
R368	1:F5	3-G1
R372	1:F5	3-D0
R375	1:E5	3-L4
R377	1:E5	3-J3
R378	1:F7	3-D4
R379	1:E5	3-J3
R380	1:E5	3-J4
R381	1:E5	3-K4
R382	1:E7	3-F6
R384	1:E7	3-F5
R385	1:F7	3-F6
R386	1:F6	3-K6
R387	1:E6	3-M4
R388	1:F6	3-J6
R389	1:E6	3-N4
R390	1:F6	3-J6
R391	1:E6	3-N4
R394	1:E7	3-G5
R396	1:E7	3-H5
R502	1:K6	5-N8
R505	1:K6	5-M7
R510	1:K6	5-M7
R515	1:H6	5-E2
R520	1:J5	5-E3
R525	1:J5	5-E3
R530	1:J5	5-E3
R535	1:J5	5-F3
R540	1:K5	5-H4
R545	1:K5	5-J3
%R550	1:K5	5-J4
%R553	1:K5	5-K3
R555	1:K5	5-K3
R560	1:K5	5-M2
R609	1:L6	6-B8
R613	1:L6	6-C8
R615	1:M5	6-F9
R617	1:M5	6-J8
R619	1:N6	6-L8
R621	1:N6	6-L8
R625	1:N6	6-L7
R629	1:M6	6-P6
R633	1:M5	6-Q8
R637	1:N5	6-K6
R638	1:N5	6-K6
R640	1:M5	6-R6
R641	1:N5	6-L4
R645	1:N5	6-L5
R649	1:M5	6-M5
R653	1:M5	6-Q4
R655	1:L4	6-B4
R656	1:L4	6-B4
R681	1:L5	6-L1
R685	1:L5	6-N2
R689	1:L6	6-Q2
R693	1:L5	6-Q0
R696	1:L6	6-Q0
R709	1:J2	7-D8
R710	1:H2	7-E7
R711	1:J2	7-B6
R734	1:K2	7-A2
R735	1:K2	7-A2
R736	1:K2	7-A2
R742	1:H2	7-B4
R743	1:H2	7-C5
R744	1:G2	7-D4
R746	1:H3	7-E4
R747	1:H3	7-E5
R748	1:J2	7-A1
R749	1:J2	7-B1

Device	PCB	Circuit
R750	1:H4	7-F9
R752	1:G4	7-F5
R753	1:G4	7-F3
R754	1:G3	7-F3
R756	1:G3	7-G5
R757	1:G4	7-G4
R758	1:H3	7-H4
R759	1:H3	7-H4
R760	1:H3	7-K4
R762	1:H3	7-K4
R763	1:H3	7-L4
R765	1:H3	7-H2
R766	1:G3	7-J3
R767	1:H3	7-K2
R769	1:H3	7-K3
R771	1:H4	7-L3
R772	1:G4	7-M2
R774	1:H4	7-M3
R775	1:H4	7-N2
R784	1:G3	7-P1
R785	1:G3	7-Q1
R786	1:G2	7-R1
R787	1:G2	7-R2
R790	1:G3	7-P0
R791	1:G3	7-Q0
R792	1:G3	7-Q0
R808	1:L2	8-B4
R809	1:L2	8-D5
R810	1:L3	8-D6
R811	1:L2	8-E6
R812	1:L2	8-D5
R813	1:L2	8-D4
R815	1:L2	8-F4
R816	1:L2	8-F4
R818	1:M2	8-F5
R819	1:M2	8-F5
R821	1:M4	8-B3
R822	1:M4	8-E3
*R824	1:L4	8-L8
*R825	1:L4	8-L8
*R826	1:L4	8-L8
*R827	1:L4	8-L7
*R828	1:L4	8-L7
*R829	1:L4	8-P9
*R830	1:L3	8-P9
*R831	1:L3	8-P9
*R832	1:L3	8-P8
*R833	1:L3	8-P8
*R835	1:L3	8-P8
*R836	1:L3	8-P8
*R837	1:L3	8-P7
*R840	1:L3	8-P7
*R841	1:L3	8-P7
*R842	1:L3	8-P6
R845	1:M4	8-Q5
R846	1:M4	8-Q4
R847	1:N3	8-Q4
R848	1:L2	8-J4
R849	1:N3	8-Q3
R853	1:M4	8-N3
R854	1:M4	8-N3
RV100	1:D8	2-J5
RV101	1:D7	2-J4
RV102	1:C9	2-N5
%RV300	1:F7	3-D7
SK200	1:C2	2-P0
*SK220	1:C2	2-C1
SK501	1:G6	5-D6
SK502	1:G6	5-D6
SK503	1:G6	5-D5
SK504	1:G5	5-D5
SK505	1:G5	5-D4
SK513	1:H5	5-H5
SK522	1:H6	5-E2

Device	PCB	Circuit
SK531	1:K6	5-N6
SK532	1:K5	5-N6
SK533	1:K5	5-N5
SK534	1:K5	5-N5
SK535	1:K5	5-N4
*SK805	1:K3	8-Q6
*SK805	1:K3	8-Q9
*SK805	1:K3	8-Q6
*SK805	1:K3	8-Q9
*SK805	1:K3	8-Q7
*SK805	1:K3	8-Q5
*SK805	1:K3	8-Q7
*SK805	1:K3	8-Q8
*SK805	1:K3	8-Q7
*SK805	1:K3	8-Q8
*SK805	1:K3	8-Q6
*SK805	1:K3	8-Q8
*SK805	1:K3	8-Q6
*SK805	1:K3	8-Q8
*SK805	1:K3	8-Q7
*SK805	1:K3	8-Q9
SK810	1:M3	8-H5
SL100	1:D6	2-A0
SL101	1:C7	2-C4
SL102	1:C7	2-C0
SL103	1:C7	2-D4
SL104	1:C6	2-D0
SL320	1:F7	3-E4
SL501	2:J5	5-G3
T610	1:L6	6-N1
TP100	1:A8	2-P8
TP101	1:B4	2-Q7
TP308	1:E7	3-G6
TP310	1:F6	3-L6
TP601	1:N5	6-K9
TP602	1:L6	6-R9
TP603	1:L5	6-J1
TP604	1:L4	6-M6
TP607	1:M5	6-J9
TP710	1:G4	7-H5
TP715	1:J2	7-C6
%X100	1:C5	2-A8
X101	1:B5	2-A7

Device	PCB	Circuit